SEPTEMBER 1957

Traffic Safety

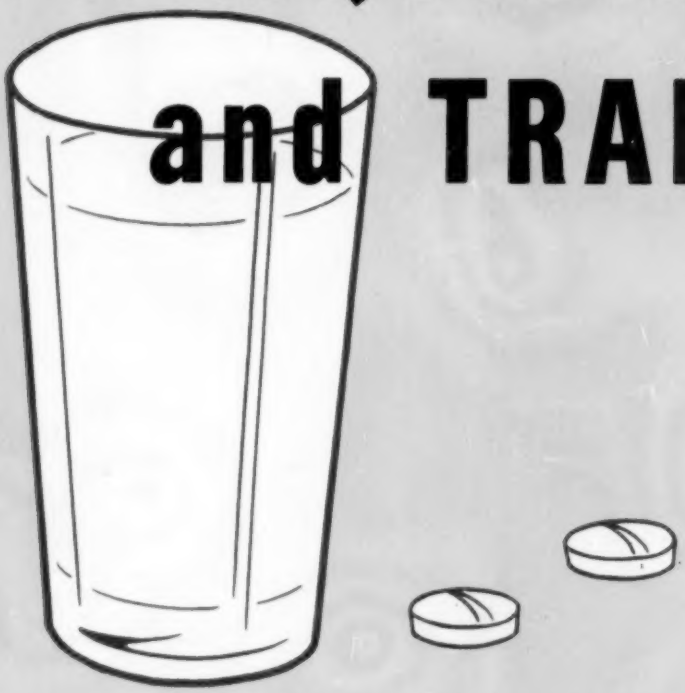
FORMERLY PUBLIC SAFETY

A NATIONAL SAFETY COUNCIL PUBLICATION

SUPERHIGHWAYS or SUPERHEADACHES?

How you can help the road building program

TRANQUILIZERS and TRAFFIC



also in this issue . . .

IMPLIED CONSENT

The New Weapon Against Drinking Drivers

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with new

FLEX-O-LITE

FREE FLOWING GLASS BEADS

FLEX-O-LITE INTRODUCES NEW FREE FLOWING REFLECTIVE GLASS BEADS

Flex-O-Lite Manufacturing Corporation, St. Louis, producer of reflective glass beads for highway markers and signs, has been granted a patent incorporating seven claims for the manufacture of its new free flowing glass beads, it was announced today by

New highs in humidity resistance, workability, ease of application, brilliance and reflectivity are available in new Free Flowing Glass Beads by Flex-O-Lite . . . finest achievement of the reflective glass bead manufacturer's art.

The result of five years of research and development, they were fully tested for 24 months with the cooperation of highway and traffic engineers. Already they are in use in several states and in many cities throughout the country. A trial order will convince you. Write us today for details and free Specifications Booklet.

FLEX-O-LITE MANUFACTURING CORP.

FLEX-O-LITE

Post Office Box 3066 (Affton Branch) • St. Louis 23, Mo.

LOOK AT THESE OUTSTANDING FEATURES:

1. Marked resistance to high humidity
2. Flow freely through dispensing equipment
3. Store for unlimited periods without agglomerating
4. Contain no injurious waxes, oils, resins or silicones
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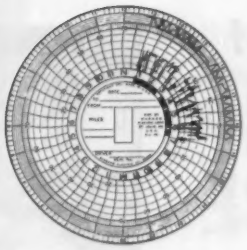
New Flex-O-Lite Positive Free Flowing Bead Dispenser

Economical answer to the problem of reflective glass bead application. Works equally well with Standard Type A, "Free-Flow" or Moisture-Resistant Type C beads. Available in 4, 5, & 6" widths. Completely automatic or may be manually operated. Send for folder.

Circle Item No. 1—Reader Service Card

Here's how Tachographs can help you!



REDUCE OPERATING COSTS

Tachographs can help you lower operating costs by verifying driver's pay (hours and miles), overtime, delays in loading or unloading, showing time and location. Tachographs help drivers control speed thus saving on gas, oil and tires. They lead the way to better driving, which reduces the number of reportable accidents and results in lower insurance rates.

PROVIDE INFORMATION IN ACCIDENT CASES

Tachographs accurately record on a wax-coated chart the exact time accident occurred and the precise speed at which your vehicle was traveling, the duration of the delay and the time travel is resumed. Tachograph charts have often been used to substantiate driver's testimony in court cases involving accidents or speeding.

REDUCE UNSCHEDULED STOPS

The wax-coated Tachograph chart permanently records when your vehicle stopped, for how long, and the total number of stops made in any 24-hour period. By comparing this information with the trip schedule, you will know exactly how many stops were made, how closely the schedule was kept and how fast the vehicle was driven.

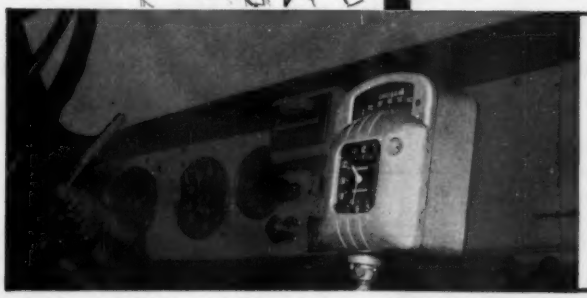
SELECT BETTER ROUTES

From your analysis of the chart, you can pin-point those areas where tie-ups are likely to occur, where slowdowns may be necessary and where traffic conditions might necessitate alternate routes. Good, too, for establishing the schedule of new runs whether normal, "express," or special.

AVAILABLE IN M.P.H. OR R.P.M. MODELS

In diesel-powered rigs, the R.P.M. Tachograph is a constant help because it shows the driver when to shift gears to reduce engine abuse from overspeeding, "lugging" and improper shifting. When installed side-by-side with a M.P.H. Tachograph unit, you get the most complete, permanent record of your vehicle's operation.

Get the full story on how it pays you to have Tachographs on your driving team. Send the coupon below for your free copy of Booklet SU-3.



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Name and Position_____

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SST-2

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Circle Item No. 2—Reader Service Card

Leading Sports Figures

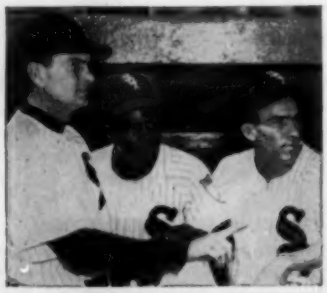
tell you their secrets of

CHAMPIONSHIP PERFORMANCE

in these Safe-Driving Films

1 SKILL IS YOUR BUSINESS. In the first film, the late Wilbur Shaw, then President of the Indianapolis Speedway, illustrates that with relaxed coordination, skillful driving can become automatic — shows how to maintain professional driving skill day after day, regardless of adverse traffic conditions or unexpected emergencies.

2 THE CHAMP BECOMES DEAF AND BLIND. Lloyd Mangrum, one of golfdom's most consistent money winners, shows that the ability to concentrate, in spite of distractions, is one big difference between a duffer and a champion. The concentration of a golf professional, Wilbur Shaw points out, is similar to that required of a professional driver.



3 NINETY-DAY FLASH. Shows through the eyes of Paul Richards, former White Sox Manager, how a ball player's slightest miscalculation, repeated often enough, can become a disastrous habit. Wilbur Shaw completes an analogy, with the visual account of a driver who developed, a "slight" habit that eventually proved fatal.

4 WATCH YOUR HANDICAP. "Drivers, like professional bowlers, can handicap their performances through lack of sleep, improper food and health habits," says Ned Day, long-time bowling champion. Film stresses the important correlation between clean living habits and clean driving records.

5 TAKE A LOOK AT THE ODDS. This concluding film in the series explains why the right safety *attitude* is so vital in the prevention of accidents—presents a dramatic sequence in which a driver's attitude prevents what could have been a fatal accident.

Each film is in full motion and sound and runs for 10 minutes. Available individually at $65.00 for black and white and $105.00 for color or on a rental basis of $10.00 for black and white and $20.00 for color.

NATIONAL SAFETY COUNCIL
425 North Michigan Avenue, Chicago 11, Illinois

Please send ____ copies of Professional Driving Series ☐ Color ($485.00) ☐ Black and White ($300.00) to the undersigned. Check or money order enclosed.

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CITY _____ ZONE _____ STATE _____

Traffic Safety

FORMERLY PUBLIC SAFETY

Volume 51 Number 3 SEPTEMBER 1957

A NATIONAL SAFETY COUNCIL PUBLICATION

TRAFFIC SAFETY is dedicated to the prevention of traffic accidents through the presentation of objective information and responsible opinion to official agencies, public support groups and the motor transportation industry. The views expressed do not necessarily reflect the beliefs or policies of the National Safety Council, but they are presented in the conviction that the pressing social problem of traffic accidents can best be resolved through freedom of expression and open debate.

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BETWEEN STOPS

WE NOTICED an item in the news the other day about a Council Bluffs (Ia.) 75-year-old who walked into the sheriff's office and told the startled deputy, "Here is my driver's license."

The man went on: "I've driven 43 years and never had an accident. But I know my reflexes aren't what they used to be. There are enough bad drivers on the road. I don't want to be another one."

You can't help but admire the integrity of such a person. Here is an example of the acceptance of personal responsibility for accident prevention.

And just a word to the boys with the quick reflexes: Take a tip from this senior citizen. A perfect record in driving and in living comes from a combination of desire and ability to do a good job. Consideration for others ranks high, too. Let's put it to work back of the wheel!

MAIL BAG

letters to the editor

Dear Sir:

I was particularly impressed with the story on the Baltimore Yellow Cab Company in the August issue of TRAFFIC SAFETY.

It is a very interesting and informative narrative and should be circulated throughout the taxicab industry.

Al Zeff, Editor
Taxicab Industry & Auto Rental News
200 West 57th St.,
New York 19, N. Y.

Dear Sir:

TRAFFIC SAFETY is an excellent publication. The research materials in particular have been excellent and can be utilized in certain aspects of our work at Indiana University.

Bernard I. Loft,
Associate Professor of Safety & Health
Indiana University,
Bloomington, Ind.

Dear Sir:

TRAFFIC SAFETY's a great job. I like the "meaty" articles . . . also the way you have keyed the items and ads to the Reader Service card. If I were an advertiser, I'd be fighting to get in.

Earl F. Campbell,
Managing Director,
California Safety Foundation
600 Market St.,
San Francisco 4, Calif.

Dear Sir:

The seat belt article in your July issue certainly seems to be one of the best and most complete treatments given to the subject. The reaction of persons within the company who were on the routing list was excellent.

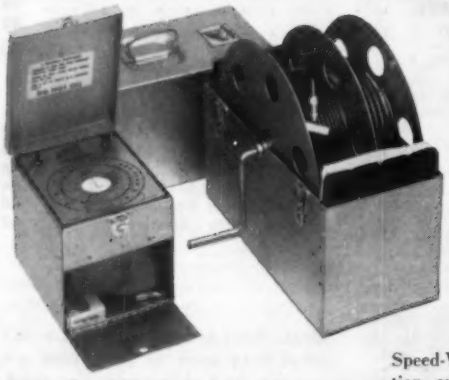
S. G. Higgins,
Industrial Merchandising,
E. I. du Pont
de Nemours & Co.
Wilmington 98, Del.

Dear Sir:

We Canadians would like to congratulate the National Safety Council on the birth of TRAFFIC SAFETY. It is a most excellent and informative magazine.

Arthur H. Rowan,
Director, Accident Records & Statistics Div.
Ontario Department of Transport
Parliament Bldgs.
Toronto 2, Ontario, Canada

SPEED-WATCH...PIONEERS IN THE FIELD...
NOW WITH THESE EXCLUSIVE FEATURES



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★ NEW WEIGHT SWITCHES
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Speed-Watch has international distribution and is widely used by many State Police departments. Over 1500 users will testify to the fine performance and gratifying results of Speed-Watch.

Available in 22 foot field distance for automatic operation; 66 foot for both automatic and manual operation and 132 foot for manual operation only.

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We have a number of good sales areas open throughout the United States and Canada for our line of Driver Safety Equipment (See page 5).

Ideal opportunity for men already in safety or driver education fields, who have spare time and want a good additional income . . . or for salesmen in an allied field looking for a secondary line.

Straight commissions.

Potential market: Commercial fleets, Insurance Companies, school, Safety Councils, governmental agencies, police departments, bus and taxi companies, etc.

Write, stating qualifications and references to:

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The largest commercial organization specializing in the engineering, designing, and manufacturing of driver training and testing equipment.

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Tests for:

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IT'S PORTABLE . . . standardized testing can be done anywhere quickly, accurately and at low cost!

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TESTS FOR

1. Visual Acuity
2. Field of Vision
3. Depth Perception
4. Color Recognition
5. Night Vision
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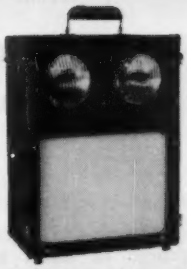
7. Reaction Time

A Complete, Portable Driver Testing and Training Workshop

PORTO-GLARE

Tests For Night Vision and Glare Recovery

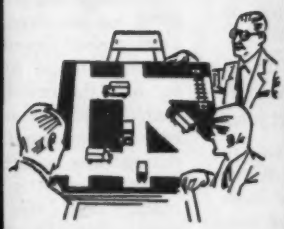
- Uses actual Sealed Beams. No more Head-in-Box Testing.
- Records subject the same as though he were on the road and driving.
- Automatic—operator is free to observe subject's Psychological Reactions.
- PORTABLE LIGHT DURABLE



AUTO DRIVE VISUAL

The Traffic Quiz . . . comes complete with carrying case.

- Contains 180 questions and answers based on the Universal Motor Vehicle Code.
- Jumbo Double Dial automatic question selector which sparks audience participation and interest.
- Answers visible only to instructor.— each instructor or "quiz-master" can conduct an expert safety meeting without preparation.
- Also contains 100 illustrations and Cartoons along with Habit Attitude Section.



SEEING IS BELIEVING! MAGNO SAF-T BOARD

The Magnetic Traffic Board that:

- Realistically presents traffic situations for group presentation.
- Uses actual scale models of cars, trucks, signs, stanchions etc.
- Proven, quick, practical way to teach drivers the PRINCIPLES of SAFETY.
- Also used in all types of accident investigations. "Review boards and as an aid in court trials to visually present evidence.

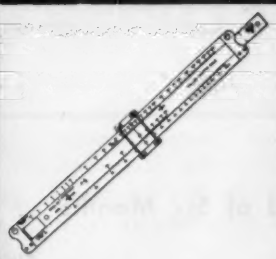
FULLER TRAFFIC SLIDE RULE

A scientific aid that makes it possible to determine the speeds of vehicles involved in accidents quickly and with precision. Complete with instruction manual and saddle leather case.

COMBINATION DETONATOR BLANKS

(not illustrated)

Includes both the explosive and the marking powder! Cleaner and easier than using separate blanks with filled gelatin capsules.

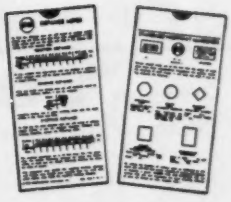


STOPPING DISTANCE METER

Plus Standard Highway Markings Chart

Handy, pocket sized — contains:

- Reaction, Braking and Total Stopping Distances in feet for individual scoring.
- Standard Highway Markings location and meanings.
- A Simple, Effective Safety Device for Everyone who drives.



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- ☐ Stopping Distance Meter
- ☐ Combination Detonator Blanks

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NATION'S TRAFFIC TOLL CHECKED FOR SEVENTH STRAIGHT MONTH

June death record marks eighth month in last nine with no increase despite tremendous travel pressures

IN THE face of rising travel and an upsurge in urban traffic deaths, America held the line for the seventh straight month in the battle to stem the tide of death and destruction on the nation's streets and highways.

June traffic deaths added up to 3,290, approximately the same number of traffic fatalities as occurred last June.

This marked the seventh month in a row and the eighth month in the last nine in which deaths have been the same or fewer than in the corresponding month a year earlier.

For the first six months of 1957, deaths totalled 17,620, down 2 per cent from the 1956 total of 18,020 for the same period.

Although the decrease in deaths in 1957 has not been large, it has been accomplished despite a rising trend in travel. Mileage figures are available for only the first four months of the year. They show a 5 per cent increase over the same months of 1956. Deaths during these months were 3 per cent fewer to produce a decrease in the mileage death rate to 5.5 from 5.9 a year earlier. Death rate is based on the number of deaths per 100,000,000 vehicle miles.

In June, 24 of 47 reporting states had decreases in deaths, while 22 had increases and one reported no change.

For six month, 25 of the 47 states had decreases, 21 had increases and one reported no change.

The unchanged death total for the nation in June was accomplished despite a hike in urban deaths. Among 602 cities of more than 10,000 population reporting June experience, deaths were 4 per cent higher than for the same month of 1956. For six months, though, the city experience was down 4 per cent compared with a 2 per cent decrease for the entire nation.

To Page 28

Leading at the End of Six Months

States

North Dakota	— 36%	Georgia	— 13%
Montana	— 25%	Louisiana	— 12%
Idaho	— 23%	Nebraska	— 12%
Colorado	— 21%	New Hampshire	— 12%
Massachusetts	— 19%	Mississippi	— 11%
Nevada	— 19%	Utah	— 9%
Wisconsin	— 18%	Missouri	— 7%
Kansas	— 17%	Indiana	— 5%
Tennessee	— 16%	New York	— 3%
Wyoming	— 16%	Alabama	— 3%
Michigan	— 14%	California	— 2%
South Dakota	— 14%	North Carolina	— 2%
Florida	— 13%		

Cities

Syracuse, N. Y.	— 57%	Philadelphia, Pa.	— 19%
Richmond, Va.	— 47%	Detroit, Mich.	— 18%
Milwaukee, Wis.	— 46%	Portland, Ore.	— 17%
Tampa, Fla.	— 40%	Birmingham, Ala.	— 10%
Fort Worth, Texas	— 39%	Jacksonville, Fla.	— 10%
St. Louis, Mo.	— 34%	Chicago, Ill.	— 9%
Boston, Mass.	— 32%	Baltimore, Md.	— 9%
Seattle, Wash.	— 31%	Denver, Colo.	— 6%
Pittsburgh, Pa.	— 28%	Memphis, Tenn.	— 6%
Omaha, Nebr.	— 27%	Oakland, Calif.	— 5%
San Diego, Calif.	— 20%	New York, N. Y.	— 4%

Today's Traffic

LOOKING AHEAD

Surprising speed data

Secret radar tests on the Ohio Turnpike have turned up some data that will surprise a lot of people. The tests showed that 93 per cent of all traffic was operating at or below the posted limits (65 mph) and only six-tenths of 1 per cent was going over 70.

Do-it-yourself parking lots

Rockville, Md., is helping solve its parking problem by giving an assist to citizens who build their own off-street residential parking facilities. The city provides basic plans, holds do-it-yourself night classes, locates dump grounds for excavated soil, and inspects the finished product. When desired, the city will even break out the curb for a nominal fee. Registration for courses has been heavy, and citizens from nearby towns want to enroll.

Thumbnail portrait of repeaters

The driver who repeatedly turns up in traffic court is generally more impulsive, less reflective, and less discriminating in his social relationships than the driver whose record shows no violations or accidents. He is also likely to be young, unmarried, and a job-changer.

These observations are made in a recently completed doctoral thesis by Earl D. Heath, member of the staff of New York University's Center for Safety Education. It is based on a two-year statistical study covering the psychological characteristics and personal backgrounds of nearly 1,000 drivers—763 repeated offenders and 195 non-offenders.

Christmas in July

A Fourth of July safety drive in Cleveland tried a novel approach. Under a gaily decorated Christmas tree installed in the downtown section, a huge sign advised motorists: Drive safely—be home for Christmas. As part of the promotion, Christmas cards bearing the message "drive safely" were distributed.

Ladies go all-out

Interest of women's organizations in traffic safety promotion continues to grow. The *International Altrusan*, monthly publication of Altrusa International, recently devoted an entire issue to the subject of traffic safety. A national poll of the organization's membership also disclosed that traffic safety was rated by most as the No. 1 project for Altrusa attention. Altrusa is an association of business and professional women executives.

Operation Egg Drop

A joint project by the Colorado State Medical Society and the Denver Police Department demonstrated again that "packaging" automobile passengers can reduce deaths and injuries. In the experiment, five fresh eggs were dropped from a height of 115 feet onto sheets of U. S. Rubber "Ensolite"—the type of padding used in many modern cars.

Padding was only 1⅛ inches thick, long diameter of the eggs was 2⅛ inches. One of the eggs landed on the crack between adjacent sheets of padding and broke. Of the four eggs which hit the target, shells of all remained intact . . . the yolk in three was unbroken, in the fourth broken.

Conclusions were that in a comparable experiment with the human skull, a pad of this material four inches thick would prevent a skull fracture in a drop of 115 feet and that brain damage would rarely occur.

Picture of adult student

What kind of people are most likely to be found in adult driver education classes? A recent study made in Kansas City disclosed the following facts about students enrolled in such courses in that city. They are almost all women, aged 35 or older—oldest was 60, youngest 15—who have had no previous driving experience. Of those who had previous driving experience, most had been taught by relatives other than parents.

Brainstorming in Wisconsin

Wisconsin traffic safety people recently borrowed an idea-producing technique from the advertising fraternity and came up with a flock of usable accident prevention ideas. Technique employed was the much-publicized "brainstorming" in which a group of people attack a problem by tossing out any possible or impossible solutions that occur to them. All critical judgment is withheld until after the session. Participants are encouraged to improve or build on ideas of others, but no negative thinking is permitted. The Wisconsin session was televised over Madison station WHA-TV.

Main Street 1969

Here's a picture of the city of the future as painted by Edward Marcus, vice president of Neiman-Marcus department store of Dallas. It will be a metropolitan core girded by a broad, landscaped expanse containing many-laned and possibly many-leveled belt roads to collect streams of incoming traffic. There will be multiple-level parking structures and terminals for all types of transportation.

The pattern of business district streets will be circular. Inside the circles will be a park-like shopping, business and cultural center with nothing moving but pedestrians.

Uniform code for hot dogs

Under the rules of the New York Thruway, no hot dog weighing less than 1/9 of a pound—excluding the roll—may be sold at concession restaurants. Also, a 10-cent cup of coffee must be a regulation seven ounces—no more, no less.

Expressways to face-lift nation?

New interstate expressways will carry "four to five times the traffic load at two to three times the speed and with 50 per cent more safety" than existing roads in metropolitan areas, in the opinion of highway expert Pyke Johnson, consultant to the Automotive Safety Foundation. Johnson also predicts that the new interstate freeways will help to face-lift cities, relieve traffic congestion, quicken the economy, save thousands of lives and avert millions of injuries.

Safety corn for Tar Heels

A rash of safety road signs—somewhat corny, but to the point—have caused quite a stir in North Carolina. The signs, erected by the State Highway Commission, urge drivers to safety in such messages as: "If your trip is too fast, it may be your last" and "Don't be impatient, it's a short hill."

Tar Heel officials have taken a lot of ribbing about this educational venture, but comments have been mostly favorable. Letters from Europe, Australia, South America and from many states have requested information on the project.

ALCOHOL AND TRAFFIC SAFETY

A medical man urges .05 per cent as the critical blood alcohol level, and challenges the liquor industry to get behind stricter laws to check drinking driver menace.

by Horace E. Campbell, M.D.

A UNITED PRESS dispatch from Washington, D. C., dated November 11, 1956, states, "The National Licensed Beverage Association called Sunday for 'more thorough investigation' of the causes of highway accidents, particularly those attributed to drunken driving."

As chairman of a state medical society committee on traffic safety, and as a member of a national committee on the medical aspects of automobile injuries and deaths, I took that advice and made a thorough investigation.

The dispatch stated, "statistics involving alcohol are frequently exaggerated," and then quoted the statistics of the National Safety Council to the effect that "only 8 per cent of drivers in all accidents and less than 6 per cent of drivers in fatal accidents 'were actually under the influence of alcohol'."

Now, it should be pointed out that these figures are derived from only 20 states, and that the driver's condition was not stated in 27 per cent of the cases. The National Safety Council report goes on to say, "Among the reporting states, drinking drivers ranged from 7 out of 100 drivers in fatal accidents to 45 out of 100."

The National Safety Council admits that the figures sent to them are far from complete, and that the varying methods of investigation and recording from state to state make these figures open to question. In the last two editions of *Accident Facts,* detailed

Dr. Campbell

figures are reported from a state where the study is known to be particularly accurate.

In the 1956 edition of *Accident Facts,* the figures from Delaware are quoted. Delaware makes a particularly careful study of its traffic fatalities.

A total of 138 drivers were involved in 97 fatal accidents. Of these, 20 drivers (14.5 per cent of the total) had .15 per cent of alcohol in their blood—considered to be definite evidence of under the influence; 13 drivers (9.4 per cent) had .05 to .14 per cent of alcohol in their blood—considered to be evidence of some degree of impairment; 3 drivers (2.2 per cent) had less than .05 per cent of alcohol in their blood, and 20 drivers (14.5 per cent), who were not tested, had been drinking, in the opinion of the investigating officer.

The results of the study thus showed a total of 56 drivers (40.6 per cent of all drivers involved in fatal accidents) as "had been drinking," either by test results or by the observations of the officer investigating the accident. Since a certain proportion of these accidents involved two or more cars (there were 41 more drivers than there were fatal accidents), it is obvious that 97 fatal accidents involved 56 drinking drivers—or 57 per cent.

The Delaware State Police reported only 75 fatal accidents in 1956, and 51 per cent of them involved a drinking driver.

The 1955 edition of *Accident Facts* carried the table below:

The report further stated, "Motor-vehicle victims 'under the influence' of alcohol (0.15% or more) totalled 4 out of 10 among the cases examined

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INCIDENCE OF ALCOHOLISM IN MOTOR-VEHICLE FATALITIES—MARYLAND 1953.

VICTIM	TOTAL CASES EXAMINED*	% ALCOHOL OF BRAIN, SPINAL FLUID OR BLOOD				
		Negative	0.01-0.04%	0.05-0.14%	0.15-0.24%	0.25% & over
Pedestrian	65	18	2	9	20	16
Driver	61	22	1	14	16	8
Passenger in M.V.	47	22	4	11	5	5
Bicyclist	2	2	0	0	0	0
Total	175	64	7	34	41	29

*Examinations were made within twelve hours after the accidents.

Dr. Campbell is chairman of the Automotive Safety Committee of the Colorado State Medical Society, and a member of the American Medical Association Committee on the Medical Aspects of Automobile Injuries and Deaths.

TRANQUILIZERS and TRAFFIC

by Robert Meyer

Millions of Americans will take billions of tranquilizer pills this year. Many of them will drive cars while under the influence of these new anxiety-reducing drugs, yet no one knows what such mass use will mean for highway safety.

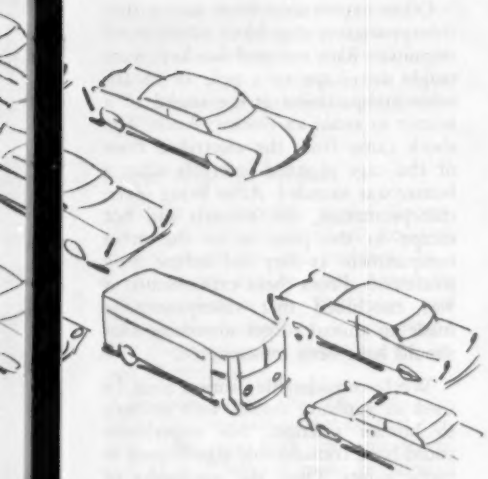
At present, hundreds of research projects are being conducted throughout the nation in an attempt to learn more about their effects on human behavior. However, the drugs are being used in ever-growing quantities *now*. The editors of TRAFFIC SAFETY believe that law enforcement agencies, traffic judges and fleet safety men should have, if not the final answers, at least a guide to present knowledge on the subject.

The editors posed four questions:

1. **Do tranquilizers impair muscular coordination or reaction time?**
2. **Do they reduce alertness and reaction to stimuli?**
3. **Do they alter social attitudes, or obedience to law and convention?**
4. **Do they have a bad effect in combination with alcohol or other drugs?**

The answers to all those questions could not be found from study of current research in the field and discussion with eminent pharmacologists and psychologists who have conducted experiments with the drugs.

Tranquilizers have been in use only a few years. Many answers simply are not known. It may take years of research and use before definite conclusions can be reached on the relationship of tranquilizers and traffic safety.



DURING his first two seasons in big league baseball, Reno Bertoia, third baseman for the Detroit Tigers, was so tense at the plate that he failed to impress sports fans as a hitter.

But as the first month of the 1957 season ended, Bertoia almost led the league, batting second only to peerless Ted Williams. As the teams approached midseason, he was still among the top hitters.

When questioned about this amazing improvement, Bertoia was quoted as explaining, "I swallow a little tranquilizer pill a half hour before each game. Occasionally, if things get tense, I'll take another."

The little pill that Reno swallowed to relieve his tension was reported to be "Equanil," one of the trade names for the tranquilizing drug, meprobamate (MEH-proe-BAM-ate).

Last year druggists sold more than 100 million dollars' worth of tranquilizers. The 1957 figure should soar toward 200 million dollars, with about 30 tranquilizers on the market and about as many more in the works by various pharmaceutical houses.

In our age of anxiety, millions of Americans, like ball player Bertoia, are looking toward this bio-chemical solution to their problems. The name "Miltown," the best known form of meprobamate, has become part of the vocabulary of a nation in search of relief from nervous tension.

The Bertoia story could lead to the conclusion that tranquilizers may make better drivers of some people. Perhaps the jittery motorist who over-reacts to traffic stimuli could gulp down a tranquilizer before getting behind the wheel, thus contributing to roadway relaxation and a serene situation on the highway.

But before trying to cure motor mania with a mass prescription for "happy pills," it might be wise to examine this subject more carefully. For while Bertoia claimed that the tranquilizing drugs helped him relax and sharpened his batting eye, there are others who have questioned their use in any activity requiring quick response and keen judgment.

In April, the Army grounded all pilots using tranquilizers, as well as barbiturates and antihistamines. The order from the Army chief of staff stated that pilots using the drugs may not fly until four weeks after they have discontinued use. "The Army is not attacking the drugs themselves," said Lt. Col. Spurgeon Neel, Army aviation medical officer. "They are wonderful medicines, but they don't mix with flying."

Need for Guidance

Do they mix with driving? The National Safety Council's Committee on Tests for Intoxication has wondered about their effect, especially in relation to alcohol. Insurance company spokesmen have expressed concern. A reckless driving case in the District of Columbia led the District's corporation counsel to examine the need for including tranquilizers in the usual legal prohibition against driving while under the influence of self-administered drugs. A Florida judge concluded a decision with an appeal for guidance.

Why this concern unless there is proof that a problem exists? The answer is that the action of a drug is a subtle thing and not readily apparent in an accident situation. An investigating officer at the present stage of information on the subject would have no reason to look for or suspect any such influence on driver behavior.

There may or may not be a problem. Present accident investigation methods and training could not be expected to reveal it. We can only deduce that a drug which has such an admittedly powerful influence on human behavior might affect ability to drive a car safely. In that light, it is useful and necessary to examine available research on the subject.

A casual reading of various newspaper accounts concerning the use of tranquilizers leads to considerable confusion. How is the judge, or the traffic official, or the fleet safety director to separate fact from fancy?

Such help is difficult to give, because there is much to be learned about the drugs and the effects they have on human behavior. Yet a considerable amount of current confusion can be cleared merely by a description of the various tranquilizers and their known characteristics.

What Is a Tranquilizer?

At the present time, such classification has more than academic importance, because every day newspapers are printing references to "tranquilizers" without stating *which* of the drugs was involved. It is this use of the word "tranquilizer" as a generic term that leads to much confusion in the public mind. If all the so-called tranquilizers had the same chemical composition, or even acted on the same portion of the nervous system, this would not be important. But the truth of the matter is that the pharmacological makeup of the new drugs *differs*, and these chemical differences are reflected in the way the drugs affect human behavior.

Thus the first question to be answered is: "What is a tranquilizer?" Tranquilizers at the present time are described more by their effects than by their chemical composition. Many drugs now labeled tranquilizers would have been classified differently had they been discovered before the word was coined, or before this period in our history which has been pointedly described as "the age of anxiety *about* anxiety."

"Tranquilizers," according to Frank M. Berger, discoverer of Miltown, "are

"PHARMACOLOGY has now entered upon a period of rapid growth, and it seems quite certain that in the next few years scores of new methods for changing the quality of consciousness will be discovered. So far as the individual human being is concerned, these discoveries will be more important, more genuinely revolutionary, than the recent discoveries in the field of nuclear physics and their application to peacetime uses. . . . Human beings will be able to achieve effortlessly what in the past could be only achieved with difficulty, by means of self-control and spiritual exercises. Will this be a good thing for individuals and for societies? Or will it be a bad thing? These are questions to which I do not know the answers. Nor, may I add, does anyone else."

—Aldous Huxley

agents that quiet seriously disturbed psychotics, cause remission of schizophrenic and paranoic symptoms, bring peace of mind to over-wrought neurotics, or antagonize the manifestations of hallucinogenic agents." A simplified definition—one used in a recent article in *Fortune* magazine — states that "tranquilizers are compounds that reduce anxiety, agitation or emotional turmoil without putting a person to sleep." In short, tranquilizers differ from bromides and sedatives in that normal doses do not induce sleep.

To avoid complicated pharmacological explanations, only two of the most popular tranquilizers—chlorpromazine (klawr-PROE-muh-zeen) and meprobamate—need to be considered. These two represent what might be called the strong and the mild type. Another main type, reserpine (trade name: Serpasil) is widely used in mental hospitals, but outpatient use is chiefly for hypertension.

Thorazine, the trade name for chlorpromazine, is the biggest selling tranquilizer. Its 1956 sales of about 25 million dollars are due in part to its great popularity in mental hospitals where it is used in the treatment of psychotic patients. However, it also is high in drug store sales, reportedly ranking fifth among all drugs. Miltown, a trade name for meprobamate, ranks ninth in sales, and Equanil (another company's name for the same drug) leads all tranquilizer sales outside of hospitals, ranking fourth in sales of all drugs.

Two Types Dominate Sales

Thus, while chlorpromazine and meprobamate are but two or more than a score of tranquilizers available, together they represent a substantial portion of the drugstore sales.

Fortunately, recently published research throws considerable light on certain side effects of these drugs that are closely related to traffic safety.

Chlorpromazine was synthesized by a French drug firm and, under the trade name Thorazine, is marketed exclusively in the United States by S. K. F. (Smith, Kline & French). It was first promoted as a drug for the prevention of vomiting, but when its use in the treatment of neurotic patients was discovered, it moved into the top ten best-selling drugs.

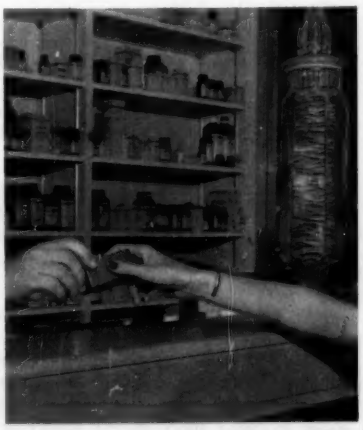
Much is known about chlorpromazine. Already more than 5,000 papers concerning it have been published in scientific journals. One study of considerable importance to safety men was conducted by Conan Kornetsky and his associates at the National Institute of Mental Health. While it is recognized that individuals differ in reaction to drugs, the study shows that chlorpromazine impairs muscular coordination, at least in tests on normal persons.

Animal Studies Revealing

Other experiments have shown that chlorpromazine may block conditioned responses. Rats, cats and monkeys were taught to escape to a pole or to another compartment at the sound of a buzzer to avoid an electric shock. The shock came from the electrified floor of the cage at fixed intervals after a buzzer was sounded. After being given chlorpromazine, the animals did not escape to the pole or to the other compartment as they did before drug treatment. From these experiments, it was concluded that chlorpromazine made an animal forget something that should have been remembered.

While considerable caution must be used in applying results with animals to human reaction, this experiment could have considerable significance in traffic safety. Once the mechanics of driving have been mastered, most driving responses are not conscious reactions but routine conditioned responses. If chlorpromazine blocks conditioned responses in animals, does it follow that a tranquilized motorist might be lulled into forgetting that red means stop?

A recent Thorazine ad in the *Journal*



SALES BOOMING
Tranquilizers among top-selling drugs in anxiety-conscious age.

of the American Medical Association states that one of the "three principal therapeutic properties" of the drug is "its ability to potentiate anesthetics, narcotics and sedatives . . ."

The fact that the drug "potentiates" —that is, intensifies or extends—the action of other drugs is a two-edged sword. For while it's very useful for the physician who is treating a patient to have a substance which will make anesthetics "go further," this same property can make for a dangerous situation in traffic.

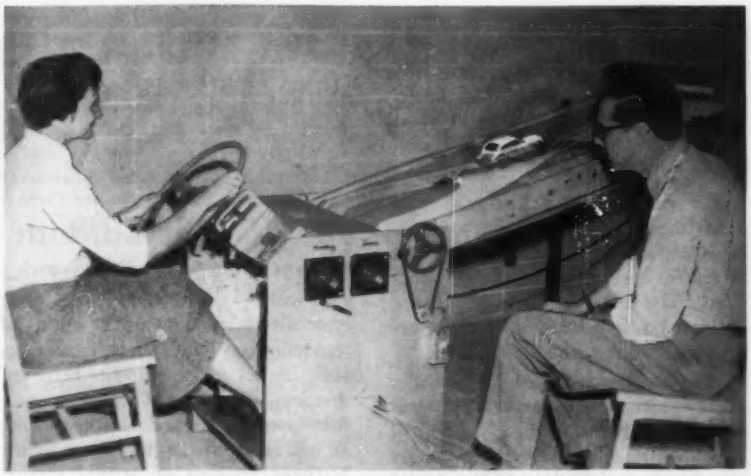
Extra "Kick" to Alcohol

Recent experiments at the University of California Medical Research Center points up this problem. In a study carried out by Drs. Alexander Simon, Thomas M. Burbridge and Violette G. Sutherland, it was found that chlorpromazine intensifies the action of alcohol.

Working with students and alcoholics, the researchers found that persons who take both chlorpromazine and alcohol become more intoxicated than those who take alcohol alone. The experiments showed that chlorpromazine "facilitates the uptake of alcohol . . . by the brain." "This finding," concluded the research team, "makes it imperative for the millions of persons taking tranquilizing drugs to be careful of their drinking when they are driving or around potentially dangerous machinery."

From what is known about chlorpromazine at this time, there is reason to believe that the drug should be handled cautiously in connection with driving. The evidence that it blocks conditioned responses in animals, impairs muscular coordination and intensifies the action of alcohol and various drugs indicates that persons using it should be warned about driving, or engaging in any activity where quick response is a matter of life and death.

Meprobamate, the milder tranquilizer, was synthesized in 1950 by Frank Berger and several associates on the staff of Wallace Laboratories. In coding the compounds used in the experiments, Berger used names of New Jersey towns. Milltown was the code name for meprobamate. When a clinical report appeared referring to meprobamate as "Milltown," Berger decided to strike out one "l" and let the name stand.



TRANQUILIZED DRIVER TAKES TEST

University of Michigan research uses Auto Trainer in driving tests. Study also included steadiness and visual checks.

Physicians are told in medical journal ads that meprobamate is "for anxiety and tension in everyday practice . . . The patient (taking Miltown) never describes himself as feeling detached or 'insulated' by the drug. He remains . . . in control of his faculties, both mental and physical . . ."

With increasing use of meprobamate by people who take the drug without discontinuing their usual activities, scientists became concerned with its effect on those activities that require a high degree of alertness, quick response and muscular coordination.

Detailed information is needed about the effects of the drug and those common but complex acts in which most people engage as part of their daily lives. Driving an automobile is one of these complex activities and potentially one of the most dangerous.

The best information to date on the effects of meprobamate as related to automobile driving comes from a research team at the University of Michigan (Donald G. Marquis, E. Lowell Kelly, James G. Miller, Ralph W. Gerard and Anatol Rapoport). Briefly, the Michigan tests on driving skills, steadiness and visual performance were conducted in this manner.

Fifty adults were given either double the normal dose of meprobamate (Miltown) or a placebo (sugar tablet). The subjects of the experiment did not know whether they received the drug or the placebo.

After a wait of 30 minutes, to allow the drug to take effect, those participating in the tests were given a series of driving tests on the AAA "Auto Trainer," which provides conventional controls and simulated driving situations on a moving belt.

Residual Effects Unknown

None of the drug treatments produced a significant change in the speed of reaction, nor in any of the other driving test scores. However, there is no information as yet on whether the residual effect of several doses over a period of time would have a cumulative result more potent than even the one double dose.

The steadiness test used was an adaptation of the Whipple Steadiness Test. The test panel contained a series of holes of decreasing size. The subject was asked to insert a round metal stylus into each of the holes and hold it there for 15 seconds without letting it touch the sides of the hole.

It is interesting to note that the steadiness test results were actually bet-

ter when meprobamate was taken with alcohol than when alcohol was taken with the placebo. Thus there was a slight suggestion that meprobamate, rather than potentiating the effects of alcohol, may actually tend to counteract them.

For visual test, the Michigan team used the master-model Ortho-Rater. This device is designed to present slides for testing various visual functions. The results of the visual test yielded no significant differences between the drugs and the placebo.

Another research study provides more evidence that meprobamate does not have a harmful effect on normal functioning. This experiment, under the direction of Wilbert McKeachie of the University of Michigan's Department of Psychology, was designed to test the effect of meprobamate on college students taking an examination. Performance on the examination was not impaired for those who received meprobamate. Actually, it was slightly better. This might have been expected, since it is obvious that anxiety and apprehension interfere with efficiency on examinations.

Drowsiness—Possible Side Effect

The primary finding of these studies is that meprobamate alone, even in double the usual dosage, produces no behavioral toxicity in the subjects as measured by driving, steadiness and vision tests.

The Michigan study also indicates that, while alcohol definitely impairs performance on some tests, combining meprobamate with the alcohol does not significantly add to this unfavorable effect on any test.

Other studies have revealed drowsiness as a possible side effect of meprobamate which might have an influence on safe driving. However, this appears to be significant only with extremely large dosages; reduced dosage usually eliminated the effect.

While the Michigan studies on the effects of meprobamate tend to give it a clean bill of health in relation to driving safety, it should be remembered that tests were limited in scope and there are still unanswered questions about the drug. Here are some of the things yet to be learned about meprobamate:

1. Are there cumulative effects involved in taking meprobamate that only appear after it has been used for a period of time?
2. Does meprobamate potentiate other drugs commonly used in medical treatment?
3. What about individual differences? Are there people who are "behaviorally allergic" to the drug?

Millions Being Spent on Research

It will be a long time before there is detailed knowledge of the effects of tranquilizers. Only lately have carefully controlled experiments been undertaken. Last year Congress appropriated two million dollars to finance an evaluation of the new drugs by the National Institute of Mental Health. A major evaluation has just been started by the Veterans Administration and other studies are being made by a number of state mental hospitals.

But public officials and others responsible for driver control and traffic safety need information before all the facts are in. The widespread use of the drugs today requires at least a tentative conclusion on their implications for traffic safety. That conclusion can be summarized as follows:

1. **Not all tranquilizers are alike. Various types have different chemical makeup, even act on different parts of the brain and nervous system.**
2. **The two most common types available for use by the public are chlorpromazine and meprobamate.**
3. **Studies of chlorpromazine indicate some effects on human behavior which could influence driving safety. Studies of meprobamate have not revealed these same characteristics. However, it must be emphasized that comparisons of dissimilar studies while suggestive, are not necessarily conclusive.**
4. **Physicians when prescribing a tranquilizer should advise patients of the possible effect on driving ability.**
5. **Public officials, while waiting the more conclusive evidence from the scientists, should stay alert to this new influence on the American scene, observe carefully any apparent relationship to accidents or violations, and take whatever medico-legal steps are finally indicated to control any harmful influence on the accident rate.**

END

NSC Gets $175,000 to Expand Field Work

The National Safety Council has received a grant of approximately $175,000 a year from the Automobile Manufacturers Association, the Association of Casualty and Surety Companies and the National Association of Independent Insurers.

The money is being contributed to finance expansion of the Council's activity in the formation and service of state and local safety councils.

Creation and strengthening of such state and local citizen groups to support public officials in bringing about greater traffic safety was the objective of the four regional conferences sponsored last year by the President's Committee for Traffic Safety.

The funds were presented to the Council through the joint Automobile and Insurance Industries Committee on Highway Safety, and were accepted for the Council by Gen. George C. Stewart, executive vice president.

"These funds," said Gen. Stewart, "will enable the Council approximately to double its present field service staff of 10 men.

"It also will make it possible for the Council to comply with the many requests for aid in forming and improving state and local citizen safety groups that we have been unable to meet with our present limited personnel.

"We will begin immediately to recruit and train additional personnel to provide the expanded services to state and local safety councils envisioned in this grant."

Gen. Stewart said the funds provided by the grant will be used on the national level, and do not reduce the need for funds provided on the state and local level for the actual formation and maintenance of citizen safety organizations.

"Without more and more such state and community groups working continuously and energetically to meet the traffic accident problem, there is little or no chance that the traffic toll will ever be reduced to any substantial degree," he said.

At present, there are approximately

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NSC BOARD ADOPTS MEMBERSHIP POLICY DOCUMENT

Nine categories of membership . . . all information now in one place . . . most dues remain the same

AT ITS June 27th meeting, the Board of Directors of the National Safety Council voted to remove membership dues schedules from the Council's by-laws and, in lieu thereof, adopted by resolution a Membership Dues and Policy Document covering all types of memberships and setting forth the Council's fundamental membership policies.

The document, which leaves most membership dues unchanged, has the effect of recording complete information on dues and services in one place. Previously, some dues were mentioned specifically in the by-laws while others were covered only in general language. In those few cases where there are dues changes, members will be informed prior to their membership anniversary dates.

Included in the new document are exhibits of membership application forms providing details on the kinds and quantities of materials and services which members receive as part of their membership. The document continues the policy adopted last year whereby members are granted a 10 per cent discount from list prices on additional purchases of materials. Individual members, however, are not allowed the discount on quantities of employee safety materials.

The document sets up nine general categories of membership and a number of subclassifications. Each type of membership is listed below.

Employee Safety—These memberships are provided for business organizations of all types, as well as government agencies, which desire information and service useful in promoting safety among their employees. There are eight specific types of membership: (1) Business and Industrial Firms, (2) Public Employee, (3) Transportation, (4) Construction, (5) Railroad, (6) Complete Motor Transportation, (7) School Bus and (8) International. The dues for School Bus membership, which went into effect on an experimental basis in 1956, are brought up to the level of Complete Motor Transportation dues. International membership was previously known as "foreign."

Insurance—These memberships are available to insurance companies and insurance agencies, which desire information and service useful in dealing with their assureds. There are four specific types of membership: (1) Casualty Insurance, (2) Life Insurance, (3) Insurance Agency and (4) Re-Insurance.

Trade and Business Association—These memberships are for trade and business associations whose members are business and industrial concerns, and who desire information and service useful in safety promotion among these members. There are two specific types of membership: (1) Association and (2) Motor Transportation Association.

Labor Organization—This membership provides information and service for any labor organization—local, state, or international.

Professional Safety Service—This membership is provided for any organization which renders professional safety consultation and service to business concerns or government agencies.

Local and State Safety Organization—This membership is available to local and state safety organizations which are deemed to have effective programs, sound financing, recognized leadership and able management. Groups which do not meet established standards in these respects may secure appropriate information and materials through subscription, pending the achievement of membership status.

School—These memberships are available for schools at all levels, elementary, secondary, and higher education; also to associations of all types in the school field. There are three specific memberships: (1) College and University, (2) School Shop and (3) School.

Public Service—This new type of membership is expected to solve the problem of providing service to individuals and to the many private organizations and governmental agencies which have a desire and a responsibility for promoting safety and which do not fit into any other membership category. Typical of the nongovernmental groups in this category are civic and service clubs, and fraternal, religious and veterans organizations. Typical of the governmental groups are police departments, highway departments, health departments, labor departments, etc.

All dues in this category represent only the cost of the service provided computed at net member prices. There are eight specific services available for this membership: (1) Home, (2) Farm, (3) School, (4) Traffic, (5) Transportation Limited, (6) Transportation Complete, (7) Industrial Limited and (8) Industrial Complete. Fourteen types of membership now existing will be converted to the new Public Service Membership.

Sustaining and Honorary—These are provided for in the Constitution to recognize (1) financial contributions and (2) outstanding service to the Council.

The Council reserves the right to deny membership to any person or organization if it believes that the affiliation of such person or organization would be inimical to the best interests of the Council or to the public welfare. The Council also reserves the right to determine which is the appropriate type of membership for any person or organization desiring to become affiliated with the Council.

Membership dues schedules and other membership arrangements contained in the document may not be changed except by action of the Board of Directors. Action to change them can be taken at any Board meeting only if the proposal is submitted to the Board in writing at least 30 days before the meeting at which the vote is to be taken.

IMPLIED CONSENT

New Weapon Against Drinking Drivers

by David G. Monroe

The year 1953 may well come to be regarded as one of the important years in the development of traffic safety.

In 1953, New York's Joint Legislative Committee on Motor Vehicle Problems issued a report which set the stage for a new approach to an ever-mounting problem—the drinking driver. This report was the basis for New York's pioneering implied consent law.

What is implied consent? Simply this: A person is granted a driver's license with the understanding that he will consent to take a chemical test for intoxication should an officer have reasonable grounds to believe that he was driving while intoxicated. The driver must take the test or lose his license.

The purpose of the implied consent law is to make possible the only reliable evidence—chemical test results—upon which to determine whether a suspected driver was or was not intoxicated within the meaning of the law.

Implied consent has caught the imagination of legislators. During 1957 no fewer than 18 states* introduced the legislation. Saskatchewan became the first Canadian province to enact implied consent legislation.

In addition to New York, three other states—Kansas, Idaho and Utah—have enacted implied consent laws. Utah was the most recent state to pass the legislation.

An additional, forward-looking step already has been taken by New York, where a bill was introduced extending the *implied* consent to one of *active* consent. Active consent provides that a person, when applying for a driving license, signs a statement in his application that he will consent to a chemical test.

The key to the effectiveness of the new approach is in the words: "If such person refuses to submit to such chemical test the test shall not be given but the commissioner (i.e., the commissioner of motor vehicles), shall revoke his license or permit to drive and any non-resident operating privilege."

This is tough talk, but there's a good reason for it.

Convictions have lagged far behind apprehensions in driving-while-intoxicated cases. The prosecution simply has not had proof beyond reasonable doubt of DWI.

Usual Signs Not Proof

Without chemical tests, the "usual" signs—breath odor, abnormal speech, clumsiness of movement, evidence of stimulation—must be depended upon to prove intoxication within the meaning of the law. This becomes a difficult, often impossible, job.

A fair-minded judge likes reliable evidence, and modern chemical tests provide the most reliable known means of obtaining *proof* of a condition of intoxication. The New York implied consent law makes the evidence available—*reliable* evidence.

As is so often the case with pioneering legislation, the implied consent law has been attacked on constitutional grounds. The first of the major cases testing the statute's constitutionality came before the Supreme Court of New York in 1954: *Schutt* v *Macduff* (127 N.Y.S. 2d 116).

The facts, briefly, are as follows: Schutt was arrested in Middletown, New York, by a police officer, without a warrant, for the offense of operating a motor vehicle in an intoxicated condition. He was taken to city police headquarters, booked, then requested by the police to go to a local hospital, there to submit to a blood test.

Schutt Loses License

He refused and was thereupon arraigned in city court. The proceedings were adjourned on his plea of not guilty. The police department then advised the commissioner of motor vehicles of Schutt's refusal to have a chemical test taken. The commissioner revoked his driver's license for the following cause: "Refused on 8/19/53, at Middletown, N. Y. to submit to a chemical test for the purpose of determining the alcohol content of his blood."

Schutt surrendered his license with objections. About a month later he was tried in city court and found not guilty by a jury. Thereupon, Schutt brought suit against the commissioner of motor vehicles contesting the revocation of his driver's license on the

*Pennsylvania, Nevada, New Mexico, Iowa, Oklahoma, Rhode Island, California, Vermont, Ohio, Michigan, Missouri, South Dakota, Wisconsin, Minnesota, Utah, Indiana, Nebraska, and Florida.

Dr. Monroe is Professor of Political Science, University of North Carolina, and is Chairman of the subcommittee on legal matters of the Council's Committee on Tests for Intoxication.

premise that the implied consent statute was unconstitutional, and, therefore, the commissioner's action was illegal and void.

The constitutionality of the statute was challenged on a number of important grounds: 1. That the "implied consent" principle, upon which the entire act was predicated, was unconstitutional, 2. That the act violated the defendant's constitutional rights as to self-incrimination, 3. That his constitutional rights protecting him from unreasonable search and seizure were violated, 4. That he was denied the equal protection of law, and 5. That he was denied life, liberty and property without due process of law. Each of these issues was ruled upon by the court in its well-considered and thoughtful opinion. They are, in brief, as follows:

The implied consent issue. Just what are the respective rights of the individual to use the public highways and the authority of the state to provide for the safe and efficient flow of traffic upon them?

From the ageless doctrine that the "king's highways are faire and free" has come the modified doctrine of this modern transportation age that the right to the use of public highways is subject to reasonable regulations by the state through its legislature or other authorized agency in the interests of the public good.

As the court held in this case, the right to use the highways is a *qualified* right and is the proper subject of licensing of those who drive. "Bearing this in mind," said the court, "the statute is equivalent to an enactment by the legislature that the operation of a motor vehicle on the highways of the state shall be deemed to constitute a consent by the operator that any license to operate it issued to him shall be deemed to have been issued subject to revocation in the event he shall refuse to submit himself to one or more of the tests therein provided for . . . The theory behind the statute is fundamentally sound."

Constitutional Approval

In these words, the court gave constitutional approval to the implied consent doctrine as a reasonable exercise of the police power of the state in the interests of public safety.

Self-incrimination. Traditionally, the self-incrimination clauses of the Federal and state constitutions (i. e., that no person in any criminal case shall be compelled to be a witness against himself) have been interpreted to mean that no person may be compelled to *say* anything which might incriminate him. The self-incrimination clauses do not normally apply to other forms of evidence. For example, for many years law enforcement officers have been constitutionally authorized to require a suspected person to submit to fingerprinting as a means of identification.

In the present case the court held that the defendant's self-incrimination rights as provided for in the Federal Constitution were not violated as this clause does not apply to state proceedings in New York.

Nor were his self-incrimination rights under New York State's constitution violated, since, as the court pointed out, the defendant was given the statutory choice of either waiving his right or of losing the privilege to continue driving on the highways.

Said the court, "Bearing in mind the purpose of the statute and that highway safety is a matter of great concern to the public, it may not be held that it is unreasonable or beyond legislative power to put such a choice to a motorist who is accused upon reasonable grounds of driving while intoxicated."

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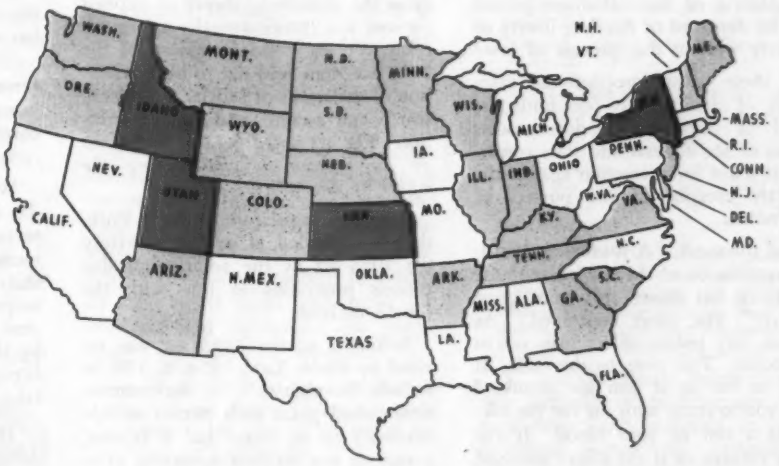
STATUS OF CHEMICAL TEST LAWS

States that have enacted the Chemical Test Section of the Uniform Vehicle Code.

States that have enacted Implied Consent law in addition to the Chemical Test Section of the Uniform Vehicle Code.



Unreasonable search and seizure. Said the court, "It is clear that, as a general proposition, the guarantee protects only against searches made without a warrant and beyond the terms of a warrant . . . or against searches made before a legal warrant . . . As a general proposition, a search and seizure of one's person following his lawful arrest, violates no law . . . In any event, the statute, when considered generally, does not stand for any unreasonable search and seizure. *This because it is premised upon the consent of the licensee to submit to the test when demanded. The licensee is expressly given the option of refusal.*" (Italics mine.)

Equal protection. Nor did the court find that the defendant's rights as to equal protection (as guaranteed by the Federal Constitution and that of New York) had been infringed by the statute.

As the court pointed out, the essence of the right to equal protection is that all persons similarly situated be treated alike. The statute does affect alike all persons licensed to operate a motor vehicle upon the state's highways. The court's opinion stated that the mere fact that the statute does not apply with equal force to *unlicensed* drivers is not material from the constitutional standpoint.

Due process of law. We come now to the court's careful and systematic examination of the important issue: Does New York's implied consent statute violate the defendant's rights of due process of law—that no person shall be deprived of his life, liberty or property without due process of law?

In these great constitutional safeguards of due process one finds the shield of liberty. The due process clauses of the federal and state constitutions stand for protection against the arbitrary exercise of the powers of government.

Said the court, "A studied and critical examination of the particular statue as written has caused this court great concern." The court continued, "As written, any police officer may say to a motorist, 'Pull over to the curb. It looks to me as if you are drunk. I want you to come with me for the taking of a test of your blood.' If the driver refuses, or if the officer assumed a refusal on the driver's part, his license may be revoked without a hearing upon a mere *ex parte** communication by the officer to the commissioner."

To the court, such procedures, under the "implied consent" statute were in serious violation of due process rights. Under the statute, as written, opined the court, a driver may be restrained of his liberty without due process, stopped on the highways without due process, then required to accompany an officer and submit to a chemical test.

Moreover, the statute provided, in effect, that the commissioner of motor vehicles may revoke a driver's license upon mere hearsay without a hearing. "Conscientious approval," continued the court, "may not be given to a statute authorizing the final revocation of a driver's license by loose and informal procedures, for thereby every automobile driver in the state will be at the mercy of the commissioner and his assistants."

The court concluded by holding the statute unconstitutional because of two fundamental defects: (1) *failure to contain a provision limiting its application to cases where there had been a lawful arrest, and* (2) *failure to include a provision entitling the licensee to a hearing upon adequate record before his license was revoked.*

Statutory Revision

The *Schutt* v *Macduff* case, described above, opened the way to further legislative clarification and improvement. The case is of major importance because the underlying theory of implied consent was constitutionally approved. Moreover, the main provisions of the 1953 act were held not to be in violation of the rights of self-incrimination, search and seizure, and equal protection. *The act failed because it did not go far enough in guaranteeing the rights of due process of law.*

The state legislature of New York, therefore, turned at once to revising the 1953 act by the addition of due process provisions in line with the court's decision.

Section I of the 1953 act was revised by Public Law, 1954, c. 320, to include the phrase ". . . the commissioner shall grant such person *an opportunity to be heard* but a license, permit or non-resident operating privilege may, upon the basis of a sworn report of the police officer that he had reasonable grounds to believe such an *arrested person* to have been driving in an intoxicated condition and that said person had refused to submit to such test, be temporarily suspended without notice pending determination upon any such hearing." (Italics mine.)

*In the interest of one side only.

Driving a Privilege

In 1955, the case of *Anderson* v *Macduff* (143 N.Y.S. 2d 257) came before the New York Supreme Court. This decision upheld the constitutionality of the revised act *in toto.* The court held that the operation of a motor vehicle on the highways is a privilege and that the legislature may prescribe sanctions and conditions in which the privilege is exercised, and may even deny that privilege, once acquired, in order to prevent unsafe driving on the highways.

Another challenging issue was also ruled upon by the court. If a person were acquitted for driving while intoxicated, nevertheless, could he be deprived of his driver's license because of his refusal to take a chemical test? The court held that the charge of driving while intoxicated and the driver's refusal to take a chemical test were separate and distinct issues. Acquittal on the drinking-driving charge did not bar state action against him for refusal to take the test.

The Chemical Test Section of the Uniform Vehicle Code, which sets up the recommended blood alcohol levels, has now been enacted by 27 states.

The Traffic and Transportation Conference of the National Safety Council has approved the revision of the Uniform Vehicle Code to include implied consent in the Code.

We have come a long way since the day in 1952 when the NSC's Committee on Tests for Intoxication recommended to state legislatures ". . . that their drivers' license act be amended to provide that, as a condition precedent to a driver's license being issued by the state, an applicant for such a license shall be required to agree to take a chemical test . . ."

This is encouraging progress indeed, in a field known more for deliberation and caution than for urgency. END

NEW POLICY STATEMENT ON NSC EMBLEMS

AT its meeting on June 27, 1957, the National Safety Council's Board of Directors adopted a new policy statement regarding use of the Council's trademarked emblems—the Green Cross for Safety emblem, and the Universal Safety emblem.

The Green Cross emblem is the one now regularly used by the Council. However, since the Universal Safety emblem also remains in use, its use, too, is covered by the policy statement.

The purpose of the new statement, Council officials indicated, is to affirm the Council's ownership of the emblems, and to set forth the ways in which the emblems may be legitimately used and the restrictions against improper use.

National Safety Council members, the statement provides, may use the emblems on letterheads and on certain materials used in safety work, provided the words "Member, National Safety Council," are printed beneath the emblem. No use is permitted, however, which would imply that the Council endorses or approves the nature of, quality of, or claims made for, any product or service.

All provisions of the policy statement apply irrespective of the color in which the emblem may be printed. Any use permitted of the emblems is subject to revocation and withdrawal by the Council at any time.

The full text of the new policy statement follows:

1. The National Safety Council is a non-profit corporation chartered by the Congress of the United States, Public Law 259, 83rd Congress, First Session, 36 U. S. Code 461, 67 Stat. 569.

2. The National Safety Council has adopted as its official emblem, and obtained trade-mark registration and protection for, the GREEN CROSS FOR SAFETY, which appears at right:

The National Safety Council has also adopted as its emblem, and obtained trade-mark registration and protection for, the cross for UNIVERSAL SAFETY, which appears at right:

3. In addition to the legal protection afforded to the Council's emblems and trade-marks under the trademark laws of the United States, the Congressional Charter specifically provides that the Council "shall have exclusive and sole right to use, or to allow or refuse the use of, such emblems, seals, and badges as it may legally adopt."

4. The right of exclusive use of its trade-marks and emblems is accompanied by an obligation upon the National Safety Council to protect the public from misuse or misrepresentation of the Council's trade-marks and emblems.

5. Pursuant to its legal rights, and in order to carry out its obligation to the public, the National Safety Council restates its basic policy that its trade-marks, emblems, seals and badges may NOT be used, under any circumstances, without its approval and authorization.

6. The Board of Directors of the National Safety Council has authorized the use of the Council's emblems and trade-marks by members of the National Safety Council under the following conditions designed to protect its legal rights in its trade-marks and emblems and to protect the public against confusion or deception:

a. The user must be a member of the National Safety Council in good standing at the time of the use of the emblems or trade-marks.

b. Beneath the emblem or trade-mark used there must appear in legible type the words "Member, National Safety Council," as shown below:

Member National Safety Council **Member National Safety Council**

c. The emblems or trade-marks, with the above-indicated words indicating membership in the National Safety Council, may be used ONLY

(1). on official letterheads of members, to signify membership in the National Safety Council;

(2). on other materials which members may use in *safety work*, to signify as a member of the National Safety Council an interest in accident prevention and safety programs, activities, achievements or educational materials. (They may not be used on awards except as such awards are authorized by the National Safety Council.)

d. The Council's trade-marks and emblems may NOT be used in such a manner, directly or indirectly, as to lead the public to believe

(1). that the National Safety Council is the origin or source, or approves the origin or source, of the goods, products or services manufactured or provided by the member;

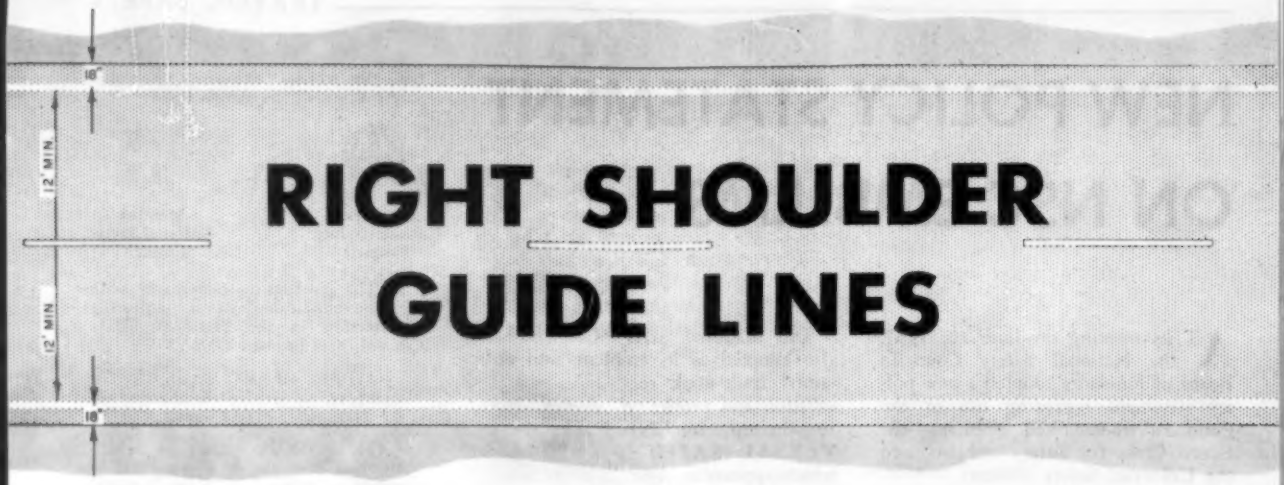
(2). that the National Safety Council endorses or approves the nature, quality or use of, or claims made for, the goods, products or services manufactured or provided by the member;

(3). that the National Safety Council endorses or approves the textual matter with which the trademark or emblem is associated by the member, unless specific authorization for such purpose has been obtained from the National Safety Council.

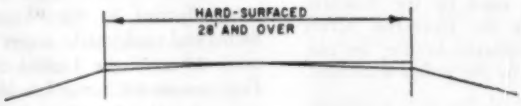
e. The use of such trade-marks or emblems shall be subject at all times to revocation and withdrawal by the National Safety Council when, in its sole and exclusive determination and judgment, the continued use would not be in the best interests of the National Safety Council.

f. The user shall submit such periodic, special or other reports and information concerning the use of the emblems or trade-marks as may be required, from time to time, by the National Safety Council.

7. The National Safety Council may authorize such other use of its trade-marks and emblems as, in its judgment, serves the purpose for which the National Safety Council was created.



RIGHT SHOULDER GUIDE LINES



by James R. Halverson

RIGHT shoulder guide lines are getting attention these days—especially in the western states where they are in widespread use.

These guide or edge lines on the right shoulder of the roadway have sparked interest and controversy among traffic officials who ask questions as to their use and value.

Officials ask: "Are guide lines effective in reducing certain types of accidents?" "Is the cost of application economically feasible?" "Is there a chance of a driver confusing the guide line with the barrier line normally placed in the center of the highway?"

We have found that the application of guide lines on the right shoulder of highways in Utah has reduced three of the most prevalent types of accidents that haunt traffic and highway engineers: head-ons, sideswipe (overtaking), and running off the roadway.

An experience in Utah and other states has clearly shown that the guide lines on the shoulder of the road helps the driver at night, in fog or inclement weather.

We studied 244 accidents along 109.8 miles of roadway before and after placement of edge markings. The drop in head-on collisions, sideswipe and running off the roadway accidents was remarkable after edge markings were laid down.

Costs—biggest item engineers have to contend with—are not great, averaging $57 per mile for a shoulder marking in both directions of 4-inch solid yellow, reflectorized paint. We used a cost basis of $3.03 per gallon for paint, including beads.

In Utah, the guide line is placed on the right shoulder of roadways 28 feet wide or wider, and where the shoulder area has the same or similar appearance or texture as the traveled lane.

To date, not a single accident caused by a driver confusing the edge line with the center line has been reported.

One example of an area where the before and after experience with right shoulder guide lines is encouraging comprises a 7.88 mile section of 30-foot roadway on State Route 48 leading to Bingham Copper Mine. This pavement has full-width bituminous surfacing with no visible difference in color or texture between the shoulder and the traveled lane.

Records from 1955 to April 30, 1957, inclusive, show a total of 37 accidents in which four persons were killed and 24 injured.

In a 19-month period before the application of the guide lines, 29 accidents were reported in which three persons were killed and 16 injured.

Head-on	2
Rear end	2
Sideswipe-overtaking	9
Turning	2
Parked	4
Miscellaneous	9
Total	28

Most prevalent among miscellaneous accidents were: lost control (3), and icy roads (3).

Then we applied guide lines on the right shoulders of the roadway, using the 4-inch solid yellow, reflectorized stripe, 18 inches in from the pavement edge. In the nine-month period—July 30, 1956, to April 30, 1957—there were eight accidents in which one person was killed and eight injured.

Head-on	1
Rear End	2
Sideswipe-overtaking	1
Miscellaneous	4
Total	8

Miscellaneous accidents included: driver asleep (2), excessive speed (1) and icy road (1).

The average daily traffic on the portion of State Route 48 under study was 2,803 vehicles in 1955, 2,846 in 1956.

Our accident studies have been limited, with samples too small to be of

The author is Chief Traffic Engineer, State Road Commission of Utah.

statistical significance. However, common sense tells us that the guide lines have been of great help to motorists at night. Our feeling on this matter has been reinforced by newspaper editorials and the many letters received complimenting the department on the pavement edge markings.

As far back as 1935, the National Committee on Joint Uniform Traffic Control Devices recognized edge markings, commenting in the 1935 edition of the Manual on Uniform Traffic Control Devices (Page 45): "Line markings on the pavement may be located along the sides of the roadway, especially on bridges, to indicate the limits of safe approach to the edge of the pavement. *These are of great benefit at night on dark-colored highways.*" (Italics mine)

At night, drivers generally either swerve toward the path of an oncoming vehicle or maneuver their cars to the right—often getting off the highway surface. The guide lines at the right shoulder help them in such cases and are a major contribution to driving ease in fog, rain or snow.

While no substitute for the divided highway, the guide lines spread traffic over the full width of the traffic lane, promoting a more uniform wear on the roadway surface.

We were concerned with the lateral placement of vehicles before and after pavement edge markings were installed. We knew that commercial vehicles have a tendency to encroach on the shoulder where the pavement is full-width and the shoulder area unmarked.

In Utah the standard construction design is base material consisting of base gravel surfacing plus oil surfacing (plant mix or road mix bituminous). This surface is carried out the full width of the roadway including the shoulder.

And we wanted to study characteristics of all vehicles and drivers on the roadway, so studies were launched.

The first study by the U. S. Bureau of Public Roads in cooperation with the Utah Highway Planning Department began in July, 1955. Before and after studies were made on U. S. 191 at locations 2 miles north, and 1.4 miles south of Plymouth, on a 40-foot bituminous pavement of the same color and texture the full width of the roadway.

Results of these studies will be published in *Public Roads*. The study was conducted for the Division of Highway Transport Research of the Bureau of Public Roads by A. Taragin, head of the Driver Behavior Unit, and reported at the January, 1957, meeting of the Highway Research Board.

The second study was made on U. S. 40-189, one-half mile north of Keetley. The pavement here is 32-foot wide, bituminous mix, straight alignment and a 3.42 grade.

We used a battery-operated 35mm

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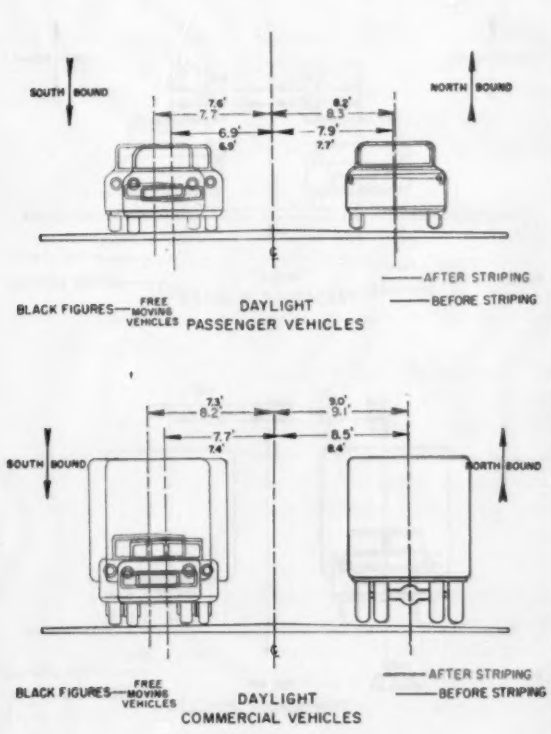
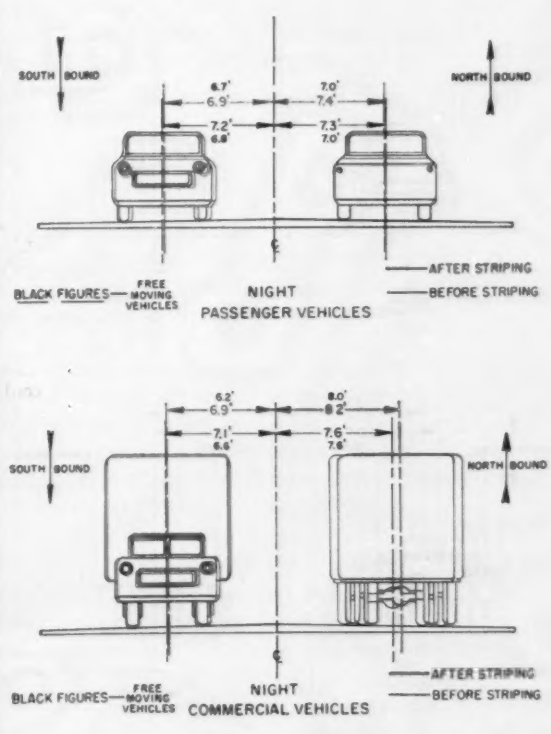


SITE 5
US-191 1.4 MILES SOUTH OF PLYMOUTH
DAYLIGHT



SITE 5
US-191 1.4 MILES SOUTH OF PLYMOUTH
NIGHT

motion picture camera mounted in back of a post carrying a 60-50 mph speed limit sign. A hole was cut into the sign to accommodate the camera lens.

Target boards, which were used as measuring scales, were 12 inches wide and 10-feet long. They were painted white with a saw tooth design in black and the points were at two-foot intervals. The boards were placed approximately 100 feet from the camera and several frames were taken with the boards in place to fix the camera angle. The boards were then removed and we began to film vehicles on the roadway.

As a vehicle approached the spot where the target board had been placed, the camera was set in motion and continued until the vehicle had passed. The elapsed time of each such filming approximated one to two seconds.

After processing, the film was studied by projecting the target board frames via a 35mm still camera. The projection was carefully plotted on the screen. Then we projected frames of each of 100 vehicle movement filmings, checking each of them carefully as to their lateral placement on the roadway. Measurements were made to the nearest foot, using the left front wheel to measure the distance from the center line of the highway.

The second phase of the study was conducted in October, 1955, after the right shoulder guide lines had been applied. Analysis was made of the filmings in the same manner.

While 100 vehicles do not furnish a sufficient number for accurate placement in this type of study, we thought some trend could be established. The majority of vehicles studied traveled with their left front wheels three to four feet from the center line (55.8 per cent before and 55.4 after). The greatest change in lateral placement was made in the distance five feet from the center line (7.8 per cent before and 15.2 after).

Charts of vehicle movement in the first area studied (U. S. 191 at locations 2 miles north and 1.4 miles south of Plymouth) are presented on these pages. They show the free movement of passenger and commercial vehicles during daylight and dark, before and after edge markings were installed.

A look at the charts shows that both passenger cars and commercial vehicles using the southbound lane stayed in the same position or moved over to the center line during both daylight and dark in the stretch 2.0 miles north of Plymouth, but that northbound vehicles stayed put or moved to the right in dark or daylight.

South of Plymouth, southbound vehicles moved to the center line at night and toward the shoulder during

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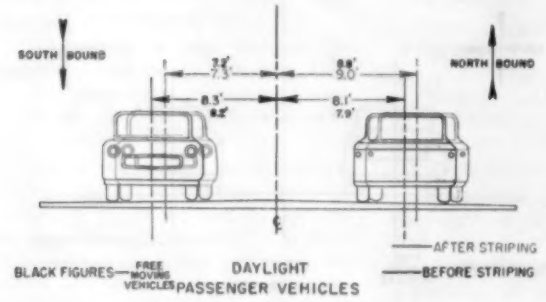
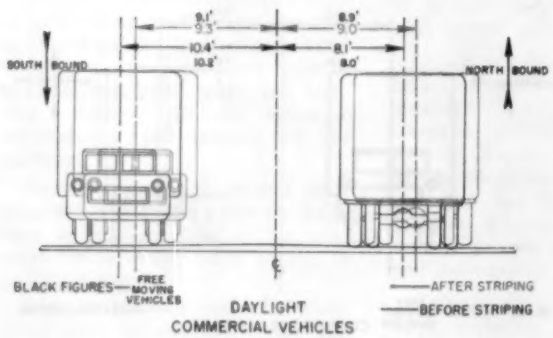
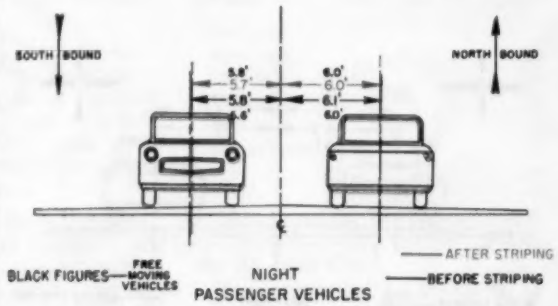
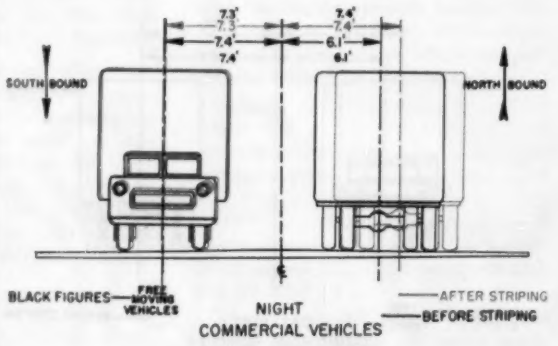




SITE 4
US-191 2.0 MILES NORTH OF PLYMOUTH
DAYLIGHT





SITE 4
US-191 2.0 MILES NORTH OF PLYMOUTH
NIGHT

Test Talk

New model Intoximeter developed

Dr. Glenn Forester, manager of the Intoximeter Association of Niagara Falls, N. Y., has announced development of a new model of the Intoximeter which will be marketed under the name Photo-Electric Intoximeter.

The new instrument takes two samples of breath simultaneously, using one to be read in a double photo cell colorimeter for an immediate and accurate measure of blood alcohol content, while the other is absorbed in perchlorate for possible laboratory analysis. In contrast to the portable Intoximeter, the new instrument is designed for station installation only.

It automatically purges all traces of earlier tests by air pumped thru the heated passages during the cycle of operation. Only deep lung breath (alveolar air) is captured for test purposes by a double piston arrangement which "locks" the dead air thru the instrument and expells it before the alveolar air is collected.

New book on chemical test case law

Robert L. Donigan, Counsel for the Traffic Institute, Northwestern University has written a 257-page book, *Chemical Tests and the Law*. This new volume covers the legal aspects and constitutional issues involved in chemical tests.—See "Safety Library" in this issue of TRAFFIC SAFETY for complete details.

Chem test laws in 27 states

Illinois became the 27th state to enact the model law on chemical tests when Governor Stratton signed Illinois H.B. 627. Illinois' new law sets up the recommended blood alcohol levels and provides that chemical test evidence may be used in both criminal and civil cases.

Montana and Arkansas both passed chemical test laws in their recent legislative sessions. Utah became the fourth state to adopt the "Implied Consent" chemical test law which requires a driver suspected of DWI to submit to a chemical test or forfeit his driving privilege. New York enacted this type of legislation in 1953 and Idaho and Kansas passed similar legislation in 1955. See article by David G. Monroe, in this issue.

T and T okays implied consent

The Traffic and Transportation Conference of the National Safety Council, by a recent poll of the 96 members has approved the "Implied Consent" provisions of the New York, Idaho, Kansas and Utah chemical test laws. These four states have passed legislation requiring motorists to take chemical tests, if they are suspected by the police, or forfeit their driving privilege.

The Traffic and Transportation Committee also has recommended to the National Committee on Uniform Laws and Ordinances that the chemical test section of the Uniform Vehicle Code be revised to include "Implied Consent."

Good Morning, Judge

Attorney hit for repeated violations

Municipal Judge Sherman G. Finesilver of Denver, Colorado recently found an attorney defendant guilty of 28 charges of illegal parking and fined him a total of $560 or $20 for each of the 28 parking violations. The court also imposed a sentence of ten days in jail, five of which were suspended, and recommended to the Colorado Motor Vehicle Department that his operators license be suspended.

In passing judgment, the court observed that the defendant had received 64 parking violation tickets, 36 of which were dismissed during the trial. The judge commented: "In our society, a particular person or class of people has no rights upon the streets or highways superior to that of any other motorist."

Ohio adopts point system

Under Ohio's new "point system" traffic safety law, the big thing is the driver's "anniversary date" and the motorist gets to set that himself. The motorist's anniversary date becomes the date of his first conviction for a violation that gives him points or demerits against his license after that date. If the driver receives more than 11 points within two years he will probably have his license to drive revoked.

Drivers receive six points each on conviction of manslaughter, driving while under the influence of intoxicating liquor, failure to stop after an accident and driving while under license suspension. For reckless driving a driver gets four points. Speeding costs three points, and all other moving violations are two points each. The point assessments are all in addition to fines, jail terms, suspensions or other penalties assessed by the courts.

When a driver gets 12 or more points in a two-year period, a judge must then determine if he is an "habitual violator" and, if so determined, he must surrender his license.

Gallup poll on safety

America's motorists today are in a mood to accept drastic measures to reduce the number of highway accidents, according to a survey conducted by the American Institute of Public Opinion and reported by Director George Gallup.

By an overwhelming majority, American motorists would require: 1. Every driver to take an annual examination to test eyesight, hearing and reactions. 2. Every driver to take a driving course before he is given a license to drive. 3. Twice a year inspection of every automobile on the road.

These findings point to one unmistakable fact: "The driving public is ready and willing to go to great lengths to cut down highway accidents."

BACK THE ATTACK ROUNDUP

Railway Express Agency has done a magnificent job of coordinating on-job and off-job activities in a sustained effort to make its accident prevention program effective. *Back the Attack on Traffic Accidents* is the company's slogan for the next 17 months of the campaign or until the traffic toll is brought down.

President A. L. Hammel sounded a rallying call to all Railway Express Agency personnel when he said: "*Back the Attack on Traffic Accidents,* the general theme of the National Safety Council's campaign, means just what it says—an all-out war against traffic accidents. Our company is making every effort to emphasize the necessity of reducing the terrible waste of human life on our streets and highways.

"Drive safely—don't speed—obey all road signs—expect and make allowances for the reckless and careless actions of others, and, above all, follow the rules of common courtesy. As express men and women we must do more than *Back the Attack*—we must *lead* it."

Top leadership of REA's far-flung operation is consistent by both exhortation and example in the effort to generate efficient teamwork from the express family that will add up to a sizeable reduction in accidents and injuries.

Robert C. Hendon, REA's vice president, operations, is a most practical man with a lively concern for the welfare of the Railway Express family. As he sees it, drivers and executive personnel of the company have a moral obligation not only to drive safely themselves but to contribute substantially to the moral climate of their home communities. That they can do this effectively by backing the National Safety Council's *Attack on Traffic Accidents* is evidenced by his most recent statement:

"The shot in the arm given Railway Express Agency's motor transportation safety program by the National Safety Council's *Back the Attack on Traffic Accidents* campaign is enthusiastically welcomed by the top management of Railway Express Agency. It is an opportunity for everyone to join this great crusade to make our streets and highways safe. And it means that we will continue to have a lively and enthusiastic leadership at the local level (for all accidents are essentially local happenings), which cannot help but be effective in America's war on traffic accidents and death."

Recently the reports began to come in from the four main regions of the express agency (Division reports stapled to the terse comments of the four divisional vice presidents would make up a volume of safety activity).

In the Southern Region, Vice President S. F. Pitcher reported from Atlanta: "Our superintendents initiated a campaign of spot safety announcements at terminals where loudspeakers are maintained. Also spot meetings are being held with drivers by vehicle supervisors at which time short safety talks are given. In addition, the program has been given stress by safety bulletins mailed direct to drivers. All agents have received a written appeal by their superintendents to cooperate fully in the campaign. Special bulletins have been sent them for posting on bulletin boards and distribution to members of the safety committee."

H. P. Dunlap, vice president of the Western Region in Chicago, reported: "Supervision in the Western Region consider *Back the Attack* campaign as their personal responsibility and are continually mindful of the critical need of reducing all accidents and resultant injuries, deaths and property damage.

"Safety *Training Fundamentals* has been reviewed with the Safety Committee members as well as with all employees in spot meetings. This program is being given wide publicity through our bulletins to employees and posters with the object of making each employee realize the important part he plays in stemming the rising number of accidents and to strike hard to achieve this result."

N. R. Johnson, vice president, Mountain-Pacific Region in San Franciso, summed it up this way: "We are enthusiastically supporting the National Safety Council *Back the Attack* program. It is a challenge to every expressman to perform his duties with such regard of safety to himself and fellow man as to preclude the possibility of an accident. We realize our objective can be attained only when every expressman understands and accepts his responsibility. All available information is being used to acquaint our people with the seriousness of the situation."

And in the Eastern Region, Vice President W. M. Smith said: "Posters are up and we are encouraging drivers to take extra care. If each driver abides by the laws in effect he will be contributing in a small but important measure to the National Safety Council *Back the Attack on Traffic Accidents* campaign."

In **New York,** the newly-appointed Governor's Coordinating Committee got down to work, sparked by the enthusiastic leadership of the Governor.

Commenting on his appointment of the committee, Gov. Harriman said, "I believe it is important to have such a group attached to the Governor's Office as recommended by the National Safety Council and the Governor's Conference Committee on Traffic Safety. . . . I am asking the Committee to evaluate the total traffic safety program in the state, in the light of the National Safety Council's Annual Inventory for 1956 and 1957 and other studies, and to recommend any needed changes. Specifically, the Committee will consider immediately the desirability of tightening up the point system for license suspension."

He further stated that "experience

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Harlow H. Curtice Salutes National Safety Council

Harlow H. Curtice, president of General Motors Corporation, and Chairman, The President's Committee for Traffic Safety, was host to the Board of Directors of the National Safety Council, who met at the General Motors Technical Center, Warren, Mich., June 27.

Mr. Curtice addressed the luncheon of the Board. His remarks follow:

AS a trustee of the National Safety Council for many years and also as chairman of the President's Committee for Traffic Safety, I have, of course, had an opportunity to observe closely the work of the Council. I know of no organization that is more worthy of public support. I know of no organization that does a better job of bringing together groups from every major segment of our economy —business and industry, labor agriculture, education, government and many others—of bringing these groups together and coordinating their efforts to produce effective results. The record speaks for itself.

In General Motors we are very proud of our plant safety record and of the 12 awards of honor we have received from the Council. Our accident frequency rate is only one-quarter what it was just ten years ago and just a little more than one-fifth that for all industry. Last year 99.76 per cent of our employes lost no time from accidents or occupational illness.

One reason for this outstanding record, we feel, is that our safety programs have emphasized the cooperative approach stressed by the Council. Another reason is the awards themselves, which are undoubtedly a stimulus to greater effort on the part of management and employes alike.

General Motors does not consider that safety ends at the plant gate. We are giving increasing attention to promoting safety away from work—in the home, in leisure-time activities and on the highway.

Of course, safety on the highway is naturally of very great concern to us. And it is here, as you are well aware, that all of us concerned with safety must face up to some grave problems.

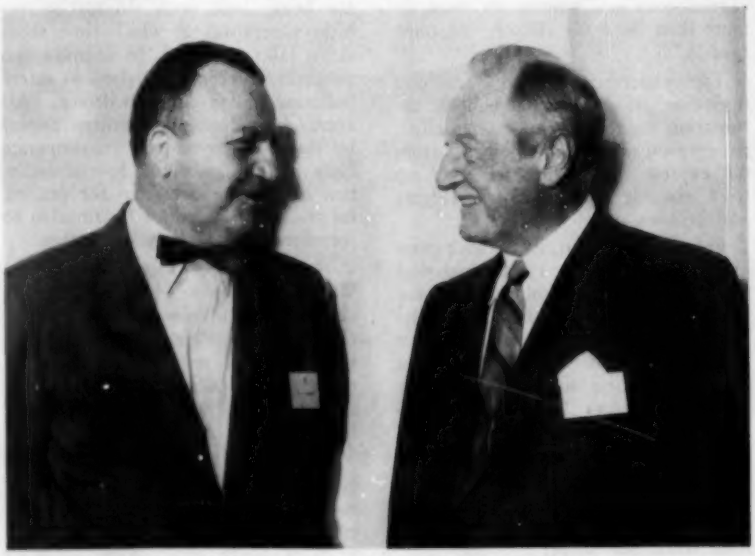
The 1957 record has been encouraging to date—perhaps your efforts and ours are beginning to pay off in fewer accidents and fewer deaths. However, a slight decrease in one year provides no real basis for optimism and could encourage unwarranted and dangerous complacency. We cannot afford to relax our efforts. We must intensify them.

As automobile manufacturers, our primary responsibility has to do with the vehicle, and we try to design it to be just as safe as possible. Obviously, any object that moves is not as safe as an object that is stationary—so our goal is relative. Moreover, we cannot control the way our products are used, which is the most critical factor affecting their safety. However, we do feel we have made tremendous progress, and we are making more every day.

Unfortunately, there are some well-meaning but unrealistic critics who appear to believe that much of the answer to greater traffic safety lies in radical changes in car design—with the government perhaps as chief engineer.

I say "unfortunately" because the publicity these critics receive serves to divert attention from the areas where the greatest progress can be made.

Turning to the other factors involved in traffic safety, I think we can agree that the nation is now making



NSC, GM ON COMMON SAFETY GROUND

General Stewart, National Safety Council, and President Curtice, GM, chat during Council directors' meeting in Detroit.

heartening progress on highway modernization. The current federal-state program will certainly make a great contribution to safety as well as to economic progress and national security.

The most pressing need now is for intensified efforts on the two other major factors in a balanced program. These are enforcement and education.

These two are obviously interrelated, because both have to do with the real key to the problem: the driver. We must do an increasingly effective job of encouraging proper skills and attitudes behind the wheel—employing both the positive force of driver education and the deterrent influence of soundly administered enforcement.

We hope that our new industry policy of further de-emphasizing speed will make a meaningful contribution in this area. This is not, of course, in any sense an "about-face." We have consistently sought to avoid advertising themes which might reasonably be construed as condoning or encouraging excessive speed. However, the growing seriousness of the traffic accident problem now appears to call for this new and stricter policy, under which we are divorcing ourselves from all racing events and avoiding any implication of speed in our advertising.

I do not believe that most people are indifferent to the traffic accident problem. I think they are deeply concerned and want sound action taken. They don't need alerting as much as they need facts and leadership.

A great deal of emphasis has been given in recent years—and wisely so—to the importance of "defensive driving" as protection against the reckless and the incompetent. Now, however, I think the public needs to go more on the offensive.

By that I mean that we need now to stress the importance of taking the offensive when not behind the wheel rather than relying solely on defensive action while driving.

We must encourage the public to back strong action against recklessness and incompetence. This should be done by giving more solid support to sound official measures in the areas of enforcement and driver licensing. It is here that we can hope for the immediate results that it is unrealistic to expect from education.

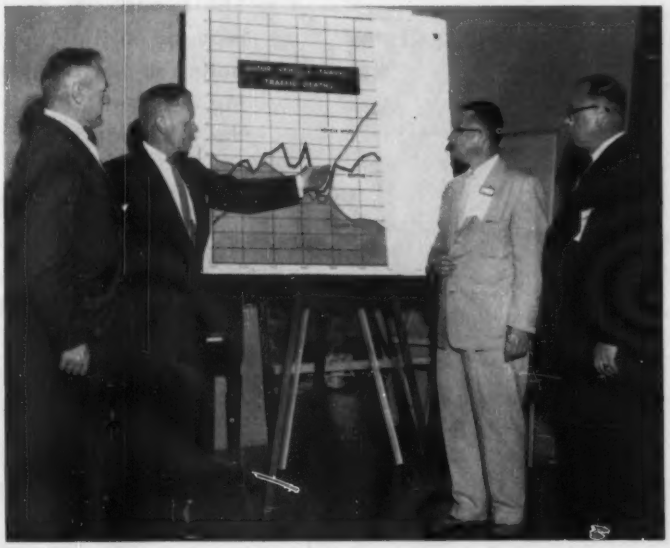
The automobile manufacturer, obviously, is not an expert in the areas of education and enforcement. But we do stand ready, in the future as in the past, to help the technical agencies where and when help is needed.

Our most recent action, taken by the AMA Board on June 6, was to approve a new program of joint grants to be made by the automobile and insurance industries to the National Safety Council. These special grants, which supplement the contributions our industry has long made to the Council through the Automotive Safety Foundation, are to be earmarked for expanding your field service for organizing state and community public support groups to further the objectives of the President's Committee for Traffic Safety.

This is a critically important operation in the broad attack on traffic accidents and one which the National Safety Council is exceptionally qualified to spearhead.

Speaking for General Motors, I assure you again of our continued interest in the vital objectives of the Council and our desire to help you move toward their fuller attainment.

Expand Wisconsin Council of Safety



WILLIAM G. JOHNSON, assistant general manager, National Safety Council, described the national traffic accident situation at the annual meeting of members of the Wisconsin Council of Safety, Inc., June 21, at Lake Delton, Wis.

Johnson's presentation was in support of the Wisconsin Council's plan to expand its traffic safety activities.

Photograph shows Johnson explaining traffic accident trends to Arthur Towell, Madison advertising executive, J. A. McIlnay, vice president, Ray-O-Vac Co., Madison, and Robert A. Olen, president, Four Wheel Drive Auto Co., Clintonville, chairman of the newly created board of trustees.

The new program was given a substantial boost at the meeting when Roy A. Dingman, vice president, A. O. Smith Corp., Milwaukee, presented the Wisconsin Council with a $1,000 check.

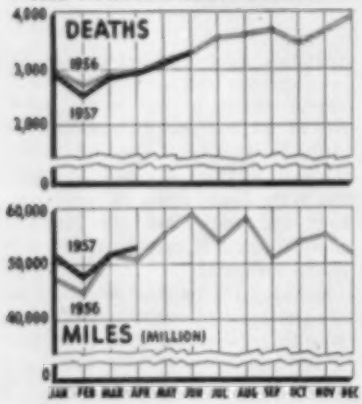
Latest Traffic Accident Data

From Page 6

At the end of 6 month, 216 of the 602 cities showed reductions in deaths compared with a year earlier.

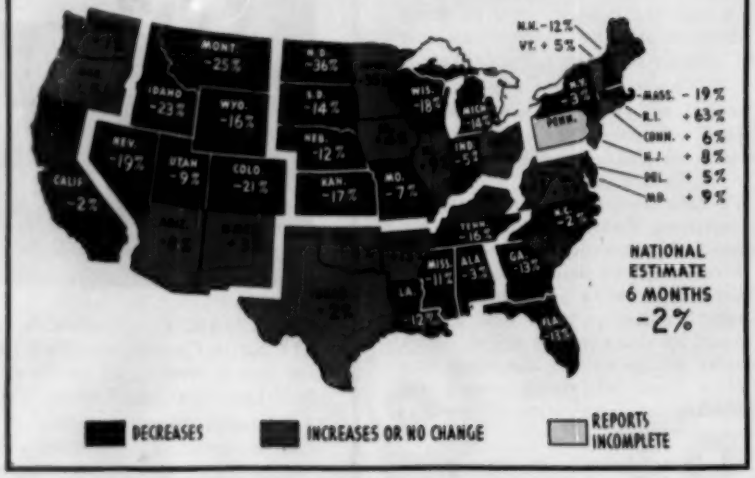
	Reg. Rate	Pop. Rate
Group I (1,000,000 and over)		
Detroit, Mich.	2.7	9.6
Chicago, Ill.	3.1	8.6
Philadelphia, Pa.	3.1	7.6
Group II (750,000 to 1,000,000)		
St. Louis, Mo.	2.5	8.6
Washington, D. C.	2.8	7.2
San Francisco, Calif.	3.2	11.6
Group III (500,000 to 750,000)		
Seattle, Wash.	1.4	6.4
Milwaukee, Wis.	1.8	6.2
Pittsburgh, Pa.	2.1	6.2
Group IV (350,000 to 500,000)		
Denver, Colo.	1.4	7.2
Indianapolis, Ind.	1.7	8.9
Portland, Ore.	1.9	10.7
Group V (200,000 to 350,000)		
Syracuse, N. Y.	0.7	2.7
Oklahoma City, Okla.	1.2	7.4
Rochester, N. Y.	1.3	5.4
Group VI (100,000 to 200,000)		
Montgomery, Ala.	0.4	1.9
Lubbock, Texas	0.4	1.9
Berkeley, Calif.	0.4	1.8
Group VII (50,000 to 100,000)		
Terre Haute, Ind.	0.0	0.0
Racine, Wis.	0.0	0.0
Abilene, Texas	0.0	0.0
Group VIII (25,000 to 50,000)		
Las Vegas, Nev.	0.0	0.0
Yakima, Wash.	0.0	0.0
Billings, Mont.	0.0	0.0
Group IX (10,000 to 25,000)		
Casper, Wyo.	0.0	0.0
St. Clair Shores, Mich.	0.0	0.0
Kingsport, Tenn.	0.0	0.0

MONTHLY MOTOR VEHICLE DEATHS AND TRAFFIC TRENDS 1956-1957



● **STATE and city death records listed on these pages are reported to the Council by state and city agencies participating in the Council's accident reporting project. Reporting deadline for cities—the 23rd, for states—the 25th, of the following month.**

CHANGES IN MOTOR-VEHICLE DEATHS
FIRST 6 MONTHS, 1956 TO 1957



MOTOR VEHICLE DEATHS
1955, 1956 and 1957

Month	1955	1956	1957	1955-57 Change	1956-57 Change
January	2,810	2,990	2,900	+ 3%	—3%
February	2,319	2,720	2,530	+ 9%	—7%
March	2,602	2,920	2,860	+10%	—2%
April	2,753	2,930	2,930	+ 6%	0%
May	3,101	3,170	3,110	0%	—2%
June	2,982	3,290	3,290	+10%	0%
Six Months	16,567	18,020	17,620	+ 6%	—2%
July	3,350	3,570			
August	3,586	3,610			
September	3,446	3,710			
October	3,918	3,460			
November	3,559	3,690			
December	4,000	3,940			
Total	38,426	40,000			

All 1955 figures are from N.O.V.S. All other figures are National Safety Council estimates. The 1957 national estimate is arrived at by assuming that the percentage change from 1956 to 1957 in the states reporting for both years reflects the 1956-1957 change in the entire country. Since national estimates made in this way become more accurate as more states report, revisions are made from time to time as new reports are received for the various months. Thus, figures above for 1957 may differ slightly from figures for the same months published in future issues of TRAFFIC SAFETY.

TRAFFIC DEATHS—CITY RECORDS

The table covers only motor-vehicle deaths resulting from traffic accidents that occurred in the city. Nontraffic motor-vehicle deaths (where the accident occurred on home or work premises) are not included; nor are deaths in the city from accidents occuring outside.

Ranking are based on the 1957 registration death rate which is the number of deaths per 10,000 registered motor vehicles on an annual basis. Vehicle registration figures are for the year 1956 and were supplied by R. L. Polk & Company.

Cities are ranked by death rates—from low to high. When two or more cities have exactly the same rate, ranking is by total vehicle registrations—from large to small.

Cities shown in heavy type have improved in 1957 compared with 1956.

The population death rate is the number of deaths per 100,000 population on an annual basis. Populations are as of April, 1950, or later censuses taken by the U. S. Bureau of Census.

	Six Months 1957	1956	1955	1957 Reg. Rate	1957 Pop. Rate
ALL REPORTING CITIES				2.2	9.0
Group I (1,000,000 and over)					
1. Detroit, Mich.	89	109	93	2.7	9.6
2. Chicago, Ill.	159	174	174	3.1	8.6
3. Philadelphia, Pa.	79	97	78	3.1	7.6
4. Los Angeles, Calif.	189	189	168	3.3	16.8
All cities in this group				3.3	8.9
5. New York, N. Y.	272	284	287	3.8	6.9
Group II (750,000 to 1,000,000)					
1. St. Louis, Mo.	37	56	40	2.5	8.6
2. Washington, D. C.	51	51	23	2.8	7.2
All cities in this group				3.1	10.2
3. San Francisco, Calif.	45	38	41	3.2	11.6
4. Baltimore, Md.	50	55	49	3.3	10.5
5. Cleveland, Ohio	59	56	58	3.8	12.9
Group III (500,000 to 750,000)					
1. Seattle, Wash.	18	26	9	1.4	6.4
2. Milwaukee, Wis.	22	41	22	1.8	6.2
3. Pittsburg, Pa.	21	29	28	2.1	6.2
4. Minneapolis, Minn.	22	11	22	2.2	8.4
5. Boston, Mass.	21	31	30	2.4	5.8
6. Dallas, Texas	32	9	21	2.4	11.6
All cities in this group				2.6	9.5
7. Buffalo, N. Y.	28	26	26	2.8	9.7
8. Houston, Texas	48	33	43	3.0	13.5
9. Cincinnati, Ohio	32	28	26	3.5	12.7
10. New Orleans, La.	47	40	28	5.5	15.6
Group IV (350,000 to 500,000)					
1. Denver, Colo.	15	16	15	1.4	7.2
2. Indianapolis, Ind.	19	17	20	1.7	8.9
3. Portland, Ore.	20	24	22	1.9	10.7
4. Kansas City, Mo.	19	18	17	2.3	8.3
5. Memphis, Tenn.	17	18	14	2.5	8.3
All cities in this group				2.6	10.9
6. San Antonio, Texas	30	22	27	3.2	13.6
7. Oakland, Calif.	21	22	14	3.3	13.1
8. San Diego, Calif.	28	35	26	3.4	11.3
9. Atlanta, Ga.	40	30	29	4.6	18.7
Group V (200,000 to 350,000)					
1. Syracuse, N. Y.	3	7	5	0.7	2.7
2. Oklahoma City, Okla.	9	9	5	1.2	7.4
3. Rochester, N. Y.	9	3	10	1.3	5.4
4. Norfolk, Va.	6	6	4	1.3	5.6
5. Omaha, Neb.	8	11	7	1.5	6.4
6. Miami, Fla.	18	13	15	1.7	13.9
7. Dayton, Ohio	12	12	14	1.7	9.8
8. St. Paul, Minn.	12	10	16	1.8	7.7
9. Richmond, Va.	10	19	10	1.9	8.4
10. Jacksonville, Fla.	9	10	9	1.9	8.8
11. Providence, R. I.	9	6	7	1.9	7.2
12. Toledo, Ohio	15	10	11	2.0	9.9
13. Honolulu, T. H.	14	7	10	2.1	11.3
All cities in this group				2.1	10.0
14. Tampa, Fla.	12	20	7	2.2	11.1
15. Fort Worth, Texas	17	28	18	2.2	10.3
16. Worcester, Mass.	7	7	2	2.5	6.9
17. Birmingham, Ala.	19	21	23	3.1	11.7
18. Akron, Ohio	27	15	11	4.4	19.7
19. Long Beach, Calif.	30	14	15	4.5	23.9
Group VI (100,000 to 200,000)					
1. Montgomery, Ala.	1	5	5	0.4	1.9
2. Lubbock, Texas	1	2	8	0.4	1.9
3. Berkeley, Calif.	1	4	0	0.4	1.8
4. Wilmington, Del.	2	3	3	0.6	3.6
5. Trenton, N. J.	2	6	2	0.6	3.1
6. Waterbury, Conn.	1	3	9	0.6	1.9
7. South Bend, Ind.	2	5	2	0.6	3.5
8. Salt Lake City, Utah	3	11	7	0.7	3.3
9. Lincoln, Neb.	2	8	0	0.8	3.4
10. Phoenix, Ariz.	6	12	13	0.8	9.3
11. Tulsa, Okla.	7	3	4	1.1	7.7
12. Hartford, Conn.	3	3	3	1.2	3.4
13. Utica, N. Y.	2	0	2	1.2	3.9
14. Sacramento, Calif.	6	13	9	1.2	7.6
15. Nashville, Tenn.	6	17	13	1.2	6.9
16. Knoxville, Tenn.	4	5	6	1.3	6.4
17. Amarillo, Texas	3	9	4	1.3	6.0
18. Allentown, Pa.	3	2	6	1.3	5.6
19. Flint, Mich.	7	6	17	1.4	8.6
20. Arlington, Va.	4	7	1	1.4	5.9
21. Shreveport, La.	5	9	4	1.4	7.9
22. San Jose, Calif.	6	13	6	1.5	9.4
23. Albuquerque, N. M.	6	3	9	1.5	8.7
24. Fresno, Calif.	7	5	4	1.5	13.0
25. Baton Rouge, La.	5	6	4	1.6	8.0
26. Yonkers, N. Y.	4	4	5	1.6	5.2
27. Little Rock, Ark.	4	5	2	1.7	7.5
All cities in this group				1.7	8.7
28. Charlotte, N. C.	7	13	14	1.8	10.4
29. Grand Rapids, Mich.	10	17	8	1.8	11.3
30. Des Moines, Iowa	8	3	5	1.8	9.0
31. Fort Wayne, Ind.	7	6	3	1.8	9.7
32. Corpus Christi, Texas	6	8	9	1.8	11.1
33. Austin, Texas	6	7	9	1.9	9.1
34. Glendale, Calif.	5	8	3	1.9	9.5
35. Youngstown, Ohio	7	9	8	1.9	8.3
36. Spokane, Wash.	8	12	7	2.0	8.6
37. El Paso, Texas	7	23	13	2.1	10.7
38. Savannah, Ga.	5	6	8	2.1	8.4
39. Peoria, Ill.	6	2	3	2.2	10.5
40. Bridgeport, Conn.	7	6	4	2.3	8.8
41. Tacoma, Wash.	9	8	9	2.3	11.5
42. New Haven, Conn.	7	5	3	2.7	8.5
43. Rockford, Ill.	9	1	7	2.8	16.1
44. Reading, Pa.	6	0	3	2.8	11.0
45. Duluth, Minn.	6	5	6	2.9	11.5
46. Erie, Pa.	9	4	5	2.9	13.8
47. Canton, Ohio	9	9	5	2.9	15.4
48. Evansville, Ind.	9	5	5	2.9	14.0
49. Gary, Ind.	10	11	9	3.1	11.8
50. Pasadena, Calif.	11	11	9	3.4	21.0
51. Mobile, Ala.	10	11	9	3.6	11.5
52. Chattanooga, Tenn.	10	14	6	3.7	15.3
53. Elizabeth, N. J.	10	5	4	5.3	17.7
Group VII (50,000 to 100,000)					
1. Terre Haute, Ind.	0	6	4	0.0	0.0
2. Racine, Wis.	0	2	2	0.0	0.0
3. Abilene, Texas	0	2	1	0.0	0.0
4. Mount Vernon, N. Y.	0	1	1	0.0	0.0
5. Sioux Falls, S. D.	0	1	3	0.0	0.0
6. Lynn, Mass.	0	2	1	0.0	0.0
7. Lorain, Ohio	0	3	1	0.0	0.0
8. Waltham, Mass.	0	3	3	0.0	0.0
9. Springfield, Ill.	1	2	6	0.4	2.4
10. Pontiac, Mich.	1	3	6	0.4	2.7
11. Pensacola, Fla.	1	4	1	0.5	3.9
12. Santa Ana, Calif.	1	5	3	0.5	2.9
13. Charleston, W. Va.	1	0	4	0.5	2.7
14. Lexington, Ky.	1	2	2	0.5	3.6
15. Columbus, Ga.	1	2	5	0.5	2.5
16. Jackson, Mich.	1	3	4	0.5	3.9
17. Binghamton, N. Y.	1	1	4	0.6	2.5
18. Muncie, Ind.	1	4	4	0.6	3.4
19. Augusta, Ga.	1	3	4	0.6	2.8
20. Lake Charles, La.	1	2	0	0.6	3.6
21. San Mateo, Calif.	1	4	2	0.7	3.3
22. Pawtucket, R. I.	1	0	1	0.7	2.5
23. Asheville, N. C.	1	0	6	0.7	3.8
24. Kenosha, Wis.	1	0	1	0.8	3.7
25. New Britain, Conn.	1	1	3	0.8	2.7
26. Raleigh, N. C.	2	3	1	0.8	6.1
27. New Rochelle, N. Y.	1	3	1	0.8	3.4
28. Burbank, Calif.	2	2	3	0.8	4.5
29. Madison, Wis.	2	1	3	0.8	4.2
30. Oak Park, Ill.	1	4	3	0.9	3.3
31. Berwyn, Ill.	1	1	2	0.9	5.8
32. Alameda, Calif.	1	1	1	1.0	2.8
33. Pueblo, Calif.	2	1	6	1.0	6.3
34. Macon, Ga.	2	0	3	1.0	5.7
35. Dubuque, Iowa	1	2	4	1.0	3.9
36. Springfield, Ohio	2	2	3	1.0	5.1
37. Orlando, Fla.	3	5	0	1.1	11.5
38. Pittsfield, Mass.	1	2	6	1.1	3.6
39. Medford, Mass.	1	5	1	1.1	3.1
40. Battle Creek, Mich.	2	0	2	1.1	7.8
41. Fort Lauderdale, Fla.	3	4	4	1.1	9.5
42. Brookline, Mass.	1	2	2	1.2	3.5
43. Davenport, Iowa	2	1	4	1.2	5.4
44. Schenectady, N. Y.	3	1	1	1.3	6.5
45. Topeka, Kans.	3	3	2	1.3	7.2
46. Santa Barbara, Calif.	2	1	3	1.3	7.9
47. Anderson, Ind.	2	2	2	1.3	8.0
48. St. Joseph, Mo.	2	3	1	1.4	5.1
49. Greenville, S. C.	3	4	2	1.4	10.3
50. Richmond, Calif.	2	10	3	1.4	4.0
51. Colorado Spgs., Colo.	3	2	1	1.4	9.6
52. Aurora, Ill.	2	0	1	1.4	7.0
53. Bay City, Mich.	2	1	2	1.5	7.6
54. Manchester, N. H.	2	2	2	1.5	4.8
55. Wilkes-Barre, Pa.	2	0	2	1.5	5.2
56. Royal Oak, Mich.	3	3	3	1.5	8.5
57. Atlantic City, N. J.	1	7	3	1.6	3.2
58. Lakewood, Ohio	2	3	2	1.6	5.9
59. Jackson, Miss.	4	3	9	1.6	8.1
60. Kalamazoo, Mich.	4	7	1	1.6	13.9
61. Winston-Salem, N. C.	4	3	0	1.7	9.1
62. Niagara Falls, N. Y.	3	8	4	1.7	6.6
63. Covington, Ky.	2	2	3	1.7	6.2
64. Wichita Falls, Texas	3	3	1	1.7	6.6
65. Hamilton, Ohio	3	3	0	1.7	10.3
66. Lansing, Mich.	5	3	5	1.7	10.9
All cities in this group				1.7	8.4
67. Johnstown, Pa.	3	1	7	1.8	9.5
68. Charleston, S. C.	2	4	1	1.8	5.7
69. Alexandria, Va.	4	1	1	1.8	12.9
70. Waco, Texas	4	7	3	1.9	9.4
71. Stamford, Conn.	3	2	7	2.0	8.1
72. Green Bay, Wis.	3	6	1	2.0	11.4
73. Evanston, Ill.	3	0	2	2.0	8.0
74. Portsmouth, Va.	3	3	2	2.1	7.5
75. Pomona, Calif.	3	1	6	2.1	11.7
76. Bethlehem, Pa.	3	3	1	2.1	9.0
77. Joliet, Ill.	4	2	3	2.2	12.9
78. Cedar Rapids, Iowa	4	3	3	2.2	11.1
79. Lancaster, Pa.	4	4	2	2.2	12.5
80. Beaumont, Texas	5	2	3	2.3	10.6
81. Greensboro, N. C.	5	4	2	2.3	13.4
82. East Chicago, Ind.	2	3	0	2.3	7.4
83. Woonsocket, R. I.	2	0	3	2.4	8.0
84. Tucson, Ariz.	10	8	0	2.6	37.9
85. Waterloo, Iowa	4	3	3	2.6	12.3
86. Stockton, Calif.	8	3	4	2.7	21.3
87. East Orange, N. J.	4	5	3	2.9	10.1
88. West Allis, Wis.	3	2	1	3.0	10.9
89. Decatur, Ill.	6	3	2	3.0	16.2
90. Roanoke, Va.	6	2	5	3.0	13.1
91. Sioux City, Iowa	5	9	0	3.1	11.9
92. Durham, N. C.	5	2	1	3.1	14.0
93. Springfield, Mo.	6	1	3	3.2	18.0
94. Columbia, S. C.	7	4	3	3.3	14.6
95. Passaic, N. J.	3	1	2	3.3	10.4
96. St. Petersburg, Fla.	13	8	13	3.5	26.9
97. Saginaw, Mich.	9	8	5	3.5	19.4
98. San Bernardino, Calif.	9	6	8	3.6	21.7
99. Brockton, Mass.	4	0	3	3.6	12.8
100. Portland, Me.	5	5	1	3.8	12.9

	Six Months 1957	1956	1955	1957 Reg. Rate	1957 Pop. Rate
101. Gadsden, Ala.	3	3	0	4.0	10.8
102. Santa Monica, Calif.	6	4	6	4.3	16.0
103. Wheeling, W. Va.	5	4	4	4.5	17.0
104. Hammond, Ind.	11	6	2	6.1	25.1
105. Fort Smith, Ark.	8	2	2	7.6	28.4
Group VIII (25,000 to 50,000)					
1. Las Vegas, Nev.	0	0	6	0.0	0.0
2. Yakima, Wash.	0	2	0	0.0	0.0
3. Billings, Mont.	0	0	1	0.0	0.0
4. Ann Arbor, Mich.	0	2	1	0.0	0.0
5. Poughkeepsie, N. Y.	0	0	1	0.0	0.0
6. Waukegan, Ill.	0	2	1	0.0	0.0
7. Beverly Hills, Calif.	0	3	1	0.0	0.0
8. Tallahasse, Fla.	0	0	0	0.0	0.0
9. Elmira, N. Y.	0	1	1	0.0	0.0
10. Hutchinson, Kans.	0	2	1	0.0	0.0
11. Elyria, Ohio	0	0	0	0.0	0.0
12. West Haven, Conn.	0	2	4	0.0	0.0
13. Richmond, Ind.	0	0	0	0.0	0.0
14. Great Falls, Mont.	0	1	3	0.0	0.0
15. Rock Island, Ill.	0	5	0	0.0	0.0
16. Owensboro, Ky.	0	2	1	0.0	0.0
17. Zanesville, Ohio	0	0	1	0.0	0.0
18. Enid, Okla.	0	1	2	0.0	0.0
19. Tuscaloosa, Ala.	0	4	1	0.0	0.0
20. Rome, Ga.	0	2	1	0.0	0.0
21. Cuyahoga Falls, Ohio	0	4	0	0.0	0.0
22. Fargo, N. D.	0	0	0	0.0	0.0
23. Eau Claire, Wis.	0	0	3	0.0	0.0
24. Arlington, Mass.	0	0	2	0.0	0.0
25. Rome, N. Y.	0	0	0	0.0	0.0
26. Elmhurst, Ill.	0	0	0	0.0	0.0
27. Gainesville, Fla.	0	1	0	0.0	0.0
28. Galesburg, Ill.	0	0	2	0.0	0.0
29. Wausau, Wis.	0	1	1	0.0	0.0
30. Kankakee, Ill.	0	0	3	0.0	0.0
31. Kingston, N. Y.	0	0	0	0.0	0.0
32. Daly City, Calif.	0	1	0	0.0	0.0
33. Mason City, Iowa	0	0	0	0.0	0.0
34. Fitchburg, Mass.	0	0	1	0.0	0.0
35. Walla Walla, Wash.	0	1	0	0.0	0.0
36. Fond du Lac, Wis.	0	0	0	0.0	0.0
37. Hackensack, N. J.	0	2	2	0.0	0.0
38. St. Louis Pk., Minn.	0	1	2	0.0	0.0
39. St. Cloud, Minn.	0	1	3	0.0	0.0
40. Petersburg, Va.	0	2	2	0.0	0.0
41. Chicago Heights, Ill.	0	1	2	0.0	0.0
42. New Kensington, Pa.	0	1	0	0.0	0.0
43. National City, Calif.	0	0	2	0.0	0.0
44. Milford, Conn.	0	0	2	0.0	0.0
45. New London, Conn.	0	2	1	0.0	0.0
46. Richfield, Minn.	0	0	0	0.0	0.0
47. Greenville, Miss.	0	0	0	0.0	0.0
48. Burlington, Vt.	0	0	1	0.0	0.0
49. Shaker Heights, Ohio	0	0	0	0.0	0.0
50. Urbana, Ill.	0	1	0	0.0	0.0
51. Winona, Minn.	0	5	4	0.0	0.0
52. Concord, N. H.	0	1	2	0.0	0.0
53. Grand Forks, N. D.	0	1	0	0.0	0.0
54. Park Forest, Ill.	0	0	0	0.0	0.0
55. Annapolis, Md.	0	0	2	0.0	0.0
56. Boise, Idaho	1	2	2	0.6	5.8
57. Warren, Ohio	1	2	4	0.7	4.0
58. Reno, Nev.	1	1	2	0.7	6.2
59. Tyler, Texas	1	1	3	0.7	5.0
60. White Plains, N. Y.	1	3	0	0.7	4.6
61. High Point, N. C.	1	1	0	0.8	5.0
62. Easton, Pa.	1	2	2	0.9	5.6
63. Council Bluffs, Iowa	1	4	0	0.9	4.4
64. Vallejo, Calif.	1	0	1	1.0	5.7
65. Plainfield, N. J.	1	1	0	1.0	4.7
66. La Crosse, Wis.	1	2	0	1.0	4.2
67. Bloomfield, N. J.	1	1	1	1.0	4.1
68. Hagerstown, Md.	1	1	2	1.0	5.5
69. Appleton, Wis.	1	1	3	1.0	5.9
70. Culver City, Calif.	1	1	4	1.1	6.4
71. Salina, Kans.	1	1	0	1.1	6.2
72. Bellingham, Wash.	1	4	1	1.1	5.6
73. Parkersburg, W. Va.	1	2	0	1.1	6.7
74. Clearwater, Fla.	1	3	1	1.1	6.9
75. Newburgh, N. Y.	1	1	2	1.1	6.3
76. Sheboygan, Wis.	1	2	2	1.1	4.7
77. Oshkosh, Wis.	1	1	1	1.1	4.9
78. Lwr. Merion Twp., Pa.	1	2	2	1.1	4.1
79. Champaign, Ill.	1	2	0	1.2	4.4
80. East Cleveland, Ohio	1	1	2	1.2	5.0
81. Portsmouth, Ohio	1	6	4	1.2	5.4
82. Chicopee, Mass.	1	2	3	1.2	4.1
83. West Hartford, Conn.	1	1	1	1.2	4.5
84. Meriden, Conn.	1	4	3	1.2	4.5
85. Ferndale, Mich.	1	0	1	1.3	6.7
86. Odessa, Texas	2	1	1	1.3	13.6
87. Barberton, Ohio	1	1	0	1.3	7.2
88. Granite City, Ill.	1	3	1	1.3	5.8
89. Maywood, Ill.	1	2	1	1.3	7.1
90. Hamden, Conn.	1	0	2	1.4	6.7
91. Norwich, Conn.	1	4	1	1.4	5.3
92. West Orange, N. J.	1	1	2	1.4	7.0
93. Palo Alto, Calif.	2	2	0	1.4	9.8
94. Torrington, Conn.	1	0	0	1.5	7.2
95. San Leandro, Calif.	2	1	2	1.5	12.2
96. Kearny, N. J.	1	2	5	1.5	5.0
All cities in this group				1.5	7.4
97. Fairfield, Conn.	1	1	3	1.6	6.6
98. Bangor, Maine	1	1	2	1.6	6.3
99. Muskegon, Mich.	3	2	0	1.6	12.4
100. Montclair, N. J.	1	2	2	1.6	4.6
101. Freeport, Ill.	1	2	0	1.7	8.0
102. Midland, Texas	2	1	0	1.7	12.1
103. Teaneck, N. J.	1	0	3	1.8	5.9
104. Everett, Wash.	2	1	3	1.8	11.7
105. Oak Ridge, Tenn.	1	1	2	1.8	6.6
106. Cheyenne, Wyo.	2	0	0	1.8	12.5
107. Highland Park, Mich.	2	4	4	1.9	8.6
108. Bristol, Conn.	1	1	3	1.9	5.6
109. Parma, Ohio	2	1	3	1.9	13.8
110. Middletown, Conn.	1	1	0	2.0	6.7
111. Mansfield, Ohio	3	7	1	2.0	13.8
112. Moline, Ill.	2	3	1	2.1	9.9
113. Wyandotte, Mich.	3	1	3	2.1	16.3
114. Wauwatosa, Wis.	2	2	1	2.2	12.0
115. Hamtramck, Mich.	2	1	2	2.3	9.2
116. Marion, Ohio	2	0	1	2.3	11.8
117. Daytona Beach, Fla.	2	2	1	2.3	13.2
118. Rapid City, S. D.	2	2	1	2.4	15.8
119. Belmont, Mass.	1	1	0	2.4	6.9
120. Rochester, Minn.	2	0	0	2.5	13.4
121. Coral Gables, Fla.	2	4	1	2.6	13.7
122. Kettering, Ohio	3	2	1	2.6	15.7
123. Euclid, Ohio	2	5	3	2.6	9.7
124. Linden, N. J.	2	2	3	2.6	13.1
125. Steubenville, Ohio	2	1	2	2.6	11.1
126. Wilmington, N. C.	3	2	3	2.9	13.3
127. Fairmont, W. Va.	2	0	0	3.0	13.7
128. Manitowoc, Wis.	2	0	0	3.0	14.5
129. Albany, Ga.	3	4	2	3.1	19.2
130. Lynchburg, Va.	3	2	2	3.2	12.6
131. University City, Mo.	3	0	0	3.4	15.0
132. Lincoln Park, Mich.	3	4	0	3.5	20.5
133. Pocatello, Idaho	3	1	0	3.6	22.1
134. Provo, Utah	2	3	2	3.6	13.8
135. Danbury, Conn.	3	0	0	3.8	19.8
136. Middletown, Ohio	4	2	1	4.0	23.7
137. Quincy, Ill.	4	2	3	4.1	18.9
138. Stratford, Conn.	4	0	0	5.0	24.0
139. Beloit, Wis.	4	0	0	5.0	27.0
140. Mishawaka, Ind.	4	1	0	5.0	24.3
141. East Hartford, Conn.	4	2	1	5.2	26.8
142. Sandusky, Ohio	4	1	1	5.2	27.2
143. Newport News, Va.	4	0	0	5.4	18.9
144. Norwalk, Conn.	4	4	4	5.6	16.2
145. Vancouver, Wash.	7	2	0	5.7	33.1
146. Danville, Va.	5	1	0	5.9	22.4
147. Pine Bluff, Ark.	5	1	1	6.1	25.1
148. Greenwich, Conn.	6	3	4	7.5	29.4
149. Superior, Wis.	4	2	0	7.6	22.7
150. Revere, Mass.	4	2	1	8.1	20.2
151. Manchester, Conn.	7	6	1	9.9	41.1
Group IX (10,000 to 25,000)					
1. Casper, Wyo.	0	2	0	0.0	0.0
2. St. Clair Shores, Mich.	0	4	4	0.0	0.0
3. Kingsport, Tenn.	0	0	0	0.0	0.0
4. Aurora, Colo.	0	0	0	0.0	0.0
5. Ventura, Calif.	0	2	2	0.0	0.0
6. Benton Harbor, Mich.	0	0	1	0.0	0.0
7. South Euclid, Ohio	0	1	1	0.0	0.0
8. Pasadena, Texas	0	0	3	0.0	0.0
9. Fort Myers, Fla.	0	1	0	0.0	0.0
10. La Mesa, Calif.	0	2	2	0.0	0.0
11. Greensburg, Pa.	0	1	1	0.0	0.0
12. Fair Lawn, N. J.	0	0	2	0.0	0.0
13. Big Spring, Texas	0	1	0	0.0	0.0
14. Austin, Minn.	0	0	0	0.0	0.0
15. Sumter, S. C.	0	0	1	0.0	0.0
16. Rock Hill, S. C.	0	1	2	0.0	0.0
17. Ponca City, Okla.	0	1	1	0.0	0.0
18. Shorewood, Wis.	0	0	3	0.0	0.0
19. Lodi, Calif.	0	1	0	0.0	0.0
20. Uniontown, Pa.	0	1	1	0.0	0.0
21. Longview, Wash.	0	0	0	0.0	0.0
22. Bell, Calif.	0	1	0	0.0	0.0
23. Lawrence, Kans.	0	0	0	0.0	0.0
24. Mankato, Minn.	0	2	0	0.0	0.0
25. Statesville, N. C.	0	0	0	0.0	0.0
26. Kinston, N. C.	0	1	0	0.0	0.0
27. Richland, Wash.	0	1	0	0.0	0.0
28. Fremont, Ohio	0	2	0	0.0	0.0
29. La Grange, Ill.	0	0	0	0.0	0.0
30. Floral Park, N. Y.	0	0	0	0.0	0.0
31. Kenmore, N. Y.	0	0	1	0.0	0.0
32. Lufkin, Texas	0	0	0	0.0	0.0
33. Meadville, Pa.	0	0	0	0.0	0.0
34. Great Bend, Kans.	0	0	1	0.0	0.0
35. Hanford, Calif.	0	0	1	0.0	0.0
36. Ames, Iowa	0	1	0	0.0	0.0
37. Plainview, Texas	0	0	1	0.0	0.0
38. Bismarck, N. D.	0	0	0	0.0	0.0
39. Port Chester, N. Y.	0	2	0	0.0	0.0
40. Sedalia, Mo.	0	0	0	0.0	0.0
41. Tiffin, Ohio	0	0	0	0.0	0.0
42. Whitefish Bay, Wis.	0	0	0	0.0	0.0
43. Frederick, Md.	0	0	1	0.0	0.0
44. Owosso, Mich.	0	0	0	0.0	0.0
45. Bloomington, Minn.	0	1	2	0.0	0.0
46. Frankfort, Ind.	0	0	0	0.0	0.0
47. Goshen, Ind.	0	1	0	0.0	0.0
48. North Platte, Neb.	0	0	0	0.0	0.0
49. Pittsburg, Calif.	0	1	0	0.0	0.0
50. Denton, Texas	0	3	0	0.0	0.0
51. Borger, Texas	0	1	2	0.0	0.0
52. Bristol, Pa.	0	0	0	0.0	0.0
53. Hibbing, Minn.	0	0	0	0.0	0.0
54. Caldwell, Idaho	0	0	0	0.0	0.0
55. Jeffersonville, Ind.	0	0	2	0.0	0.0
56. Valparaiso, Ind.	0	0	1	0.0	0.0
57. Pittsburg, Kans.	0	0	0	0.0	0.0
58. Griffin, Ga.	0	0	2	0.0	0.0
59. Connersville, Ind.	0	0	1	0.0	0.0
60. Streator, Ill.	0	0	0	0.0	0.0
61. Peru, Ind.	0	1	0	0.0	0.0
62. Mt. Vernon, Ill.	0	1	1	0.0	0.0
63. Cape Girardeau, Mo.	0	1	1	0.0	0.0
64. Sterling, Ill.	0	0	0	0.0	0.0
65. Emporia, Kans.	0	0	0	0.0	0.0
66. Hillside, N. J.	0	0	0	0.0	0.0
67. Wilmette, Ill.	0	2	0	0.0	0.0
68. Wisconsin Rpds., Wis.	0	0	1	0.0	0.0
69. Xenia, Ohio	0	1	0	0.0	0.0
70. Johnson City, N. Y.	0	0	0	0.0	0.0
71. Bellevue, Pa.	0	0	0	0.0	0.0
72. East Lansing, Mich.	0	0	0	0.0	0.0
73. McAlester, Okla.	0	0	0	0.0	0.0
74. Highland Park, Texas	0	0	0	0.0	0.0
75. Wallingford, Conn.	0	3	1	0.0	0.0
76. Moorhead, Minn.	0	0	1	0.0	0.0
77. Suffolk, Va.	0	0	1	0.0	0.0
78. Elmwood Park, Ill.	0	1	3	0.0	0.0
79. Brainerd, Minn.	0	0	0	0.0	0.0
80. Canton, Ill.	0	0	0	0.0	0.0
81. North Adams, Mass.	0	1	3	0.0	0.0
82. San Marino, Calif.	0	1	1	0.0	0.0
83. Newton, Kans.	0	1	0	0.0	0.0
84. Norfolk, Neb.	0	0	0	0.0	0.0
85. Attleboro, Mass.	0	0	1	0.0	0.0
86. Stevens Point, Wis.	0	2	0	0.0	0.0
87. Mt. Pleasant, Mich.	0	1	0	0.0	0.0
88. Boone, Iowa	0	1	1	0.0	0.0
89. Owatonna, Minn.	0	0	0	0.0	0.0
90. Faribault, Minn.	0	1	0	0.0	0.0
91. Rocky River, Ohio	0	0	0	0.0	0.0
92. East Moline, Ill.	0	0	0	0.0	0.0
93. Winfield, Kans.	0	0	0	0.0	0.0
94. Lamesa, Texas	0	0	0	0.0	0.0
95. Fergus Falls, Minn.	0	0	0	0.0	0.0
96. Bristol, Va.	0	0	1	0.0	0.0
97. St. Joseph, Mich.	0	0	0	0.0	0.0
98. South Orange, N. J.	0	0	0	0.0	0.0
99. River Rouge, Mich.	0	3	2	0.0	0.0
100. Logan, Utah	0	0	1	0.0	0.0
101. Needham, Mass.	0	1	0	0.0	0.0
102. Albany, Calif.	0	0	0	0.0	0.0
103. Gardner, Mass.	0	1	0	0.0	0.0
104. Hopewell, Va.	0	1	1	0.0	0.0
105. Garden City, Kans.	0	2	0	0.0	0.0
106. Conneaut, Ohio	0	0	0	0.0	0.0
107. Mitchell, S. D.	0	0	1	0.0	0.0
108. Atchison, Kans.	0	0	1	0.0	0.0
109. Marshfield, Wis.	0	0	1	0.0	0.0
110. Darien, Conn.	0	1	4	0.0	0.0
111. Central Falls, R. I.	0	0	0	0.0	0.0
112. Beaver Dam, Wis.	0	1	0	0.0	0.0
113. Virginia, Minn.	0	0	0	0.0	0.0
114. Albion, Mich.	0	2	0	0.0	0.0
115. State College, Pa.	0	0	0	0.0	0.0
116. Vernon, Conn.	0	2	0	0.0	0.0
117. Du Bois, Pa.	0	1	0	0.0	0.0
118. Hornell, N. Y.	0	0	0	0.0	0.0
119. Bellefontaine, Ohio	0	0	0	0.0	0.0
120. Red Wing, Minn.	0	0	1	0.0	0.0
121. Rialto, Calif.	0	5	—	0.0	0.0
122. Los Alamos, N. M.	0	0	0	0.0	0.0
123. Marinette, Wis.	0	1	0	0.0	0.0
124. Bemidji, Minn.	0	0	0	0.0	0.0
125. Moscow, Idaho	0	0	0	0.0	0.0
126. Cadillac, Mich.	0	0	1	0.0	0.0
127. La Salle, Ill.	0	0	1	0.0	0.0
128. Swampscott, Mass.	0	0	1	0.0	0.0
129. Windsor, Conn.	0	3	1	0.0	0.0
130. Two Rivers, Wis.	0	0	0	0.0	0.0
131. Groton, Conn.	0	4	1	0.0	0.0
132. Milford, Mass.	0	0	0	0.0	0.0
133. Branford, Conn.	0	1	5	0.0	0.0
134. West Lafayette, Ind.	0	0	1	0.0	0.0
135. Webster, Mass.	0	0	1	0.0	0.0
136. Stoughton, Mass.	0	0	2	0.0	0.0
137. Fairfield, Ala.	0	0	1	0.0	0.0
138. Amherst, Mass.	0	0	0	0.0	0.0
139. Takoma Park, Md.	0	1	0	0.0	0.0
140. Grosse Pte. Wds., Mich.	0	0	0	0.0	0.0
141. Donora, Pa.	0	1	0	0.0	0.0
142. Enfield, Conn.	0	2	2	0.0	0.0
143. Modesco, Calif.	1	2	2	0.5	11.5
144. Birmingham, Mich.	1	0	1	0.7	12.9
145. Mt. Clemens, Mich.	1	0	1	1.0	11.8
146. Santa Cruz, Calif.	1	1	1	1.1	9.1
147. Robbinsdale, Minn.	1	0	0	1.2	17.7
148. Boulder, Colo.	1	0	0	1.3	10.0
149. Janesville, Wis.	1	0	0	1.4	8.0
150. Findlay, Ohio	1	2	2	1.4	8.4

	Six Months 1957	1956	1955	1957 Reg. Rate	1957 Pop. Rate
151. Westfield, N. J.	1	1	0	1.4	9.4
152. El Carrito, Calif.	1	2	0	1.5	8.5
All cities in this group				1.5	8.7
153. Houma, La.	1	0	0	1.6	11.5
154. Rahway, N. J.	1	1	4	1.7	9.4
155. Ocala, Fla.	1	5	0	1.7	17.1
156. Minot, N. D.	1	1	0	1.8	9.1
157. Wooster, Ohio	1	0	1	1.9	14.3
158. Homewood, Ala.	1	0	1	1.9	11.1
159. Edina, Minn.	1	0	0	2.0	9.1
160. East Haven, Conn.	1	0	0	2.0	16.4
161. Monterey, Calif.	1	0	3	2.0	9.2
162. Denison, Texas	1	3	2	2.0	11.4
163. Ashland, Ohio	1	1	2	2.1	14.0
164. East Detroit, Mich.	2	3	0	2.1	18.6
165. Aberdeen, S. D.	1	1	0	2.1	9.5
166. Reidsville, N. C.	1	0	1	2.1	17.1
167. Marietta, Ohio	1	0	1	2.2	12.5
168. Cranford, N. J.	1	0	0	2.2	10.8
169. Texarkana, Ark.	1	0	1	2.2	10.2
170. South Portland, Me.	1	0	0	2.2	9.1
171. Leominster, Mass.	1	0	0	2.3	8.1
172. Wheaton, Ill.	1	1	0	2.3	10.8
173. Maple Heights, Ohio	1	3	1	2.3	12.8
174. Butler, Pa.	2	0	1	2.3	17.0
175. Stillwater, Okla.	1	0	0	2.4	9.9
176. Klamath Falls, Ore.	2	0	0	2.4	25.2
177. Alpena, Mich.	1	1	0	2.4	15.3
178. Cedar Falls, Iowa	1	1	0	2.4	14.0
179. Monroe, N. C.	1	1	1	2.4	19.8
180. Arkansas City, Kans.	1	0	0	2.4	14.2
181. Ypsilanti, Mich.	2	0	0	2.5	21.9
182. Victoria, Texas	2	0	1	2.5	24.8
183. Newport Beach, Calif.	1	1	1	2.5	9.4
184. Monroe, Mich.	2	0	0	2.6	18.6
185. Greenwood, Miss.	1	0	1	2.6	11.0
186. Massena, N. Y.	1	0	0	2.6	15.3
187. Niles, Ohio	1	2	1	2.6	11.9
188. Antioch, Calif.	1	1	0	2.7	12.9
189. Sweetwater, Texas	1	1	1	2.7	14.7
190. Astoria, Ore.	1	1	0	2.8	16.3
191. Monrovia, Calif.	2	2	0	2.8	17.1
192. Sault Ste. Marie, Mich.	1	0	0	2.8	11.2
193. Naugatuck, Conn.	1	0	1	2.9	11.4
194. Brawley, Calif.	1	1	1	2.9	15.3
195. Watertown, Wis.	1	0	3	2.9	16.1
196. Hollywood, Fla.	3	0	2	3.0	26.3
197. Winnetka, Ill.	1	0	0	3.0	15.3
198. Garland, Texas	2	0	0	3.1	37.7
199. Shelton, Conn.	1	0	0	3.1	15.7
200. Carlsbad, N. M.	2	2	0	3.2	22.2
201. Rye, N. Y.	1	0	1	3.2	17.1
202. Ecorse, Mich.	1	0	2	3.3	11.2
203. Ansonia, Conn.	1	0	1	3.3	10.7
204. Mansfield, Conn.	1	1	3	3.4	20.0
205. Bowling Green, Ohio	1	0	0	3.5	16.7
206. Webster Grooves, Mo.	2	0	0	3.5	17.1
207. Charles City, Iowa	1	0	0	3.6	19.4
208. River Forest, Ill.	1	0	0	3.6	17.4
209. North Miami, Fla.	1	1	1	3.6	8.5
210. Orange, Calif.	2	2	3	3.7	24.0
211. Westport, Conn.	2	2	1	3.7	34.2
212. Ironwood, Mich.	1	1	1	3.9	17.4
213. Winchester, Conn.	1	0	0	4.0	19.0
214. Ottawa, Ill.	2	1	0	4.0	22.2
215. Ridgeville Pk., N. J.	1	0	1	4.4	16.7
216. Oswego, N. Y.	2	0	0	4.6	17.7
217. Niles, Mich.	3	1	0	4.6	45.8
218. La Porte, Ind.	3	0	1	4.8	29.4
219. Saint Augustine, Fla.	2	0	0	4.8	29.4
220. Derby, Conn.	1	0	0	4.8	19.4
221. El Dorado, Kans.	2	0	0	4.9	33.9
222. Roseville, Mich.	4	1	0	5.3	30.6
223. Muskegon Hts., Mich.	2	1	1	5.5	21.3
224. Napa, Calif.	3	2	0	5.5	65.4
225. Salisbury, N. C.	4	1	4	5.6	39.8
226. Windham, Conn.	2	2	0	5.9	25.2
227. Wethersfield, Conn.	2	1	1	6.1	32.0
228. So. Milwaukee, Wis.	2	1	0	6.2	31.0
229. Martinsburg, W. Va.	3	0	0	6.5	38.5
230. Livonia, Mich.	5	2	6	6.5	57.1
231. Albert Lea, Minn.	3	0	0	6.6	44.4
232. Livermore, Calif.	2	0	0	6.6	39.2
233. Lake Worth, Fla.	4	0	0	6.6	52.3
234. Watertown, Conn.	1	0	0	6.9	18.7
235. Berkley, Mich.	3	0	0	7.1	33.5
236. Beacon, N. Y.	2	0	1	8.2	28.6
237. Hawthorne, N. J.	3	0	0	8.6	40.5
238. Fort Thomas, Ky.	2	1	0	8.6	36.7
239. Southington, Conn.	2	2	2	9.2	30.5
240. Calumet City, Ill.	4	1	0	9.3	40.0
241. Grosse Pte. Pk., Mich.	2	1	0	9.3	30.5
242. Las Cruces, N. M.	4	1	1	9.4	65.0
243. Van Wert, Ohio	3	0	0	9.9	57.7
244. Killingly, Conn.	2	0	1	11.6	40.0
245. Stonington, Conn.	2	0	0	26.7	33.9

CANADIAN CITIES

Medicine Hat, Alta.	0	0	0	—	0.0
Red Deer, Alta.	0	0	0	—	0.0
Calgary, Alta.	3	6	7	—	4.6
Edmonton, Alta.	5	8	9	—	6.3
Toronto, Ont.	59	33	23	—	9.1
Hamilton, Ont.	12	15	7	—	11.5
Montreal, Que.	73	56	42	—	14.3
Lethbridge, Alta.	3	0	3	—	26.2

TRAFFIC DEATHS—STATE RECORDS

Deaths are reported by state traffic authorities.

Population Rate: U. S. population rate is the estimated annual number of deaths per 100,000 population, assuming that deaths for the rest of the year will follow the normal seasonal pattern. State population rate is the estimated annual number of deaths per 100,000 population, assuming that the monthly average of deaths will remain at the present average for the rest of the year. Population rates are based on July 1, 1956, population estimates, U. S. Bureau of the Census, Washington, D. C.

States shown inheavy type have improved in 1957 compared with 1956, or showed no change. All figures are provisional.

Mileage Rate: The number of deaths per 100 million vehicle miles of travel.

(Figures in parenthesis following the 1957 mileage rate indicate the number of months for which the mileage rate is calculated for each state.)

	Months Reported	Deaths Identical Periods 1957	1956	1955	% Changes 1956 to 1957	1955 to 1957	1957 Pop. Rate	1957 Mile. Rate	
TOTAL U.S.	6	17,620	18,020	16,567	— 2%	+ 6%	21.1	5.3	(4)
Ala.	6	428	441	374	— 3%	+ 14%	27.3	8.4	(4)
Ariz.	6	222	205	142	+ 8%	+ 56%	42.0	8.6	(5)
Ark.	6	236	209	160	+ 13%	+ 48%	26.0	9.2	(3)
Calif.	6	1,651	1,690	1,395	— 2%	+ 18%	24.6	5.3	(4)
Colo.	6	138	175	171	— 21%	— 19%	17.1	3.4	(3)
Conn.	6	134	127	147	+ 6%	— 9%	12.0	2.6	(4)
Del	6	42	40	43	+ 5%	— 2%	20.9	4.0	(4)
D. of C.	6	31	31	23	0%	+ 35%	7.2	2.4	(4)
Fla.	6	528	608	488	— 13%	+ 8%	28.0	5.8	(5)
Ga.	6	459	528	440	— 13%	+ 4%	24.7	6.5	(4)
Idaho	6	84	109	71	— 23%	+ 18%	26.9	6.1	(1)
Ill.	6	1,026	938	930	+ 9%	+ 8%	21.8	6.5	(4)
Ind.	6	510	535	496	— 5%	+ 3%	23.1	5.0	(4)
Ia.	6	318	307	261	+ 4%	+ 22%	23.6	5.3	(5)
Kans.	6	249	300	268	— 17%	— 7%	23.7	5.6	(4)
Ky.	6	378	340	340	+ 11%	+ 11%	25.1	7.5	(4)
La.	6	352	401	274	— 12%	+ 28%	23.4	7.1	(5)
Me.	6	60	54	51	+ 11%	+ 18%	13.2	3.2	(4)
Md.	6	259	237	239	+ 9%	+ 8%	18.4	4.9	(4)
Mass.	6	207	254	237	— 19%	— 13%	8.6	2.3	(4)
Mich.	6	675	783	800	— 14%	— 16%	18.0	4.6	(5)
Minn.	6	290	215	259	+ 35%	+ 12%	17.9	4.7	(4)
Miss.	6	212	239	213	— 11%	0%	20.0	5.5	(4)
Mo.	6	473	511	417	— 7%	+ 13%	22.2	5.1	(4)
Mont.	6	87	116	93	— 25%	— 6%	27.3	5.6	(4)
Neb.	6	123	139	136	— 12%	— 10%	17.4	3.8	(4)
Nev.	6	52	64	73	— 19%	— 29%	42.1	6.7	(2)
N. H.	6	36	41	62	— 12%	— 42%	12.9	3.3	(5)
N. J.	6	388	360	345	+ 8%	+ 12%	14.4	3.6	(4)
N. M.	6	183	178	137	+ 3%	+ 34%	44.9	6.5	(3)
N. Y.	6	906	932	895	— 3%	+ 1%	11.2	4.4	(4)
N. C.	6	494	506	493	— 2%	0%	22.3	6.1	(4)
N. D.	6	41	64	48	— 36%	— 15%	12.5	—	—
Ohio	6	932	929	835	0%	+ 12%	20.5	4.9	(4)
Okla.	6	311	299	262	+ 4%	+ 19%	27.8	6.2	(4)
Ore.	6	198	188	169	+ 5%	+ 17%	23.1	5.6	(3)
Pa.	6	620	678	597	— 9%	+ 4%	13.6	4.0	(4)
R. I.	6	39	24	40	+ 63%	— 3%	9.4	3.1	(4)
S. C.	6	344	315	296	+ 9%	+ 16%	29.2	8.7	(4)
S. D.	6	65	76	87	— 14%	— 25%	18.7	5.8	(4)
Tenn.	6	291	348	362	— 16%	— 20%	16.8	4.8	(4)
Texas	6	1,138	1,135	1,134	+ 2%	+ 2%	25.9	5.4	(4)
Utah	6	91	100	93	— 9%	— 2%	22.4	—	—
Vt.	6	44	42	33	+ 5%	+ 33%	23.8	7.2	(4)
Va.	6	394	383	378	+ 3%	+ 4%	21.6	4.9	(4)
Wash.	6	226	224	189	+ 1%	+ 20%	16.9	4.6	(4)
W. Va.	6	224	191	179	+ 17%	+ 25%	22.6	7.2	(4)
Wis.	6	367	448	358	— 18%	+ 3%	19.5	6.2	(3)
Wyo.	6	54	64	61	— 16%	— 11%	33.6	6.9	(3)
CANADIAN PROVINCES									
Alta.	6	90	92	92	— 2%	— 2%	19.2	———	———
B. C.	5	83	82	54	+ 1%	+ 54%	17.1	———	———
Man.	5	39	36	25	+ 8%	+ 56%	12.1	———	———
Sask.	5	35	15	24	+133%	+ 46%	10.1	———	———

Right Shoulder Guide Lines

From Page 22

the day, while northbound vehicles moved away from the center line day and night.

Modern use of pavement edge markings includes experience in Arizona, California, Colorado, Idaho, New Mexico, Oregon, Texas and Washington among western states. The Merritt Parkway began using them in 1953, as did the New Jersey Turnpike. The Maryland and New Jersey highway departments have made extensive use of right shoulder guide lines, as have Connecticut and Virginia.

In recent years, several studies of the effect of these markings on driver behavior have been undertaken. S. T. Hitchcock, chief of the Division of Highway Transport Research, Bureau of Public Roads, U. S. Department of Commerce, reports six of them.

"Arizona's Dashed Shoulder Stripe," by William E. Wiley, *Traffic Quarterly*, April, 1955.

"Pavement Edge Lines on Twenty-four Foot Surfaces in Louisiana," by L. T. Thomas, Jr., January, 1957 meeting of the Highway Research Board. (Not yet published. Contact author at Louisiana Department of Highways.)

"Driver Behavior as Related to Shoulder Type and Width on Two-Lane Highways," by A. Taragin, January, 1957, meeting of the Highway Research Board. (Not yet published but available from Mr. Taragin, U. S. Bureau of Public Roads.)

Student Thesis, Yale University, Bureau of Highway Traffic, 1954. (Not published. Contact Fred Hurd, Director of the Yale Bureau.)

Student Thesis, Purdue University. (In progress. Contact Professor of Transportation Engineering, Purdue University, West Lafayette, Ind.)

"Side of Pavement Line," *Engineering News Record*, April 7, 1955.

As time goes by, we will add to our experience with right shoulder guide lines on Utah roads. We have had solid support from drivers and the press and radio. One Salt Lake City newspaper devoted a long editorial to the subject, praising the State Road Commission for "improvements of moderate cost and great value which should be noted and applauded by Utah's citizens."

The editorial went on: "The reasons are fairly obvious. It is axiomatic that when meeting a car at night a driver should not look at the approaching lights but at the right edge of the roadway. A stripe there gives him something specific to look at and to guide him. It accurately defines the traffic lane and, perhaps most important of all, tends to move the driver over to the right, away from the center line. Wherever it has been tried, the right shoulder guide line has significantly reduced the number of head-on collisions.

". . . Ten years from now motorists may wonder—as we do now about the center line—how on earth they used to get along without the right shoulder guide line."—END

MOTOR-VEHICLE DEATHS AND INJURIES BY STATES — 1957 and 1956

Twenty-one states reported more injuries during the first four months of 1957 than for the same period last year. Twelve states and the District of Columbia recorded fewer injuries.

For four months or less, 47 states and the District of Columbia reported. Twenty-eight states tallied more injuries, and 19 states and the District of Columbia counted fewer.

For the entire reporting period, 19 states listed more traffic deaths, 27 states and the District of Columbia recorded fewer, and one state reported no change from last year.

MOTOR-VEHICLE DEATHS AND INJURIES BY STATES 1957 and 1956

	Months Reported **	Deaths		Injuries		% Changes 1956 to 1957		1957 Ratio of Injuries to Deaths
		1957	1956	1957	1956	Deaths	Injuries	
TOTAL U. S.	—	9,475	9,727	347,865	339,061	— 3	+ 3	37
Ala.	4	285	290	1,469*	1,805*	— 2	—19	5
Ariz.	4	156	143	2,519	2,391	+ 9	+ 5	16
Ark.	4	179	126	882	857	+42	+ 3	5
Calif.	4	1,058	1,068	42,630	40,241	— 1	+ 6	40
Colo.	4	78	95	2,789	2,923	—18	— 5	36
Conn.	4	72	85	6,298	5,513	—15	+14	87
Del.	4	24	26	720	730	— 8	— 1	30
D. of C.	4	19	24	2,111	2,244	—21	— 6	111
Fla.	4	396	435	11,590	11,016	— 9	+ 5	29
Ga.	4	302	330	2,668	3,434	— 8	—22	9
Idaho	3	28	43	499	689	—35	—28	18
Ill.	4	647	581	28,371	26,435	+11	+ 7	44
Ind.	4	318	337	11,334	11,011	— 6	+10	36
Ia.	3	128	153	4,607	4,144	—16	+11	36
Kans.	4	166	188	3,088	3,138	—12	— 2	19
Ky.	4	234	201	3,771	4,067	+16	— 7	16
La.	2	112	117	1,186	1,224	— 4	— 3	11
Me.	4	34	34	1,480	773	0	+91	44
Md.	4	156	153	5,652	6,200	+ 2	— 9	36
Mass.	2	47	85	14,091	14,711	—45	— 4	300
Mich.	4	421	506	16,801	17,868	—17	— 6	40
Minn.	4	183	112	6,481	6,233	+63	+ 4	35
Miss.	3	95	115	1,442	1,470	—17	— 2	15
Mo.	4	294	333	3,380	3,276	—12	+ 3	11
Mont.	3	58	53	439	568	+15	—23	12
Neb.	4	74	92	2,659	2,480	—20	+ 7	36
Nev.	2	15	14	266	237	+ 7	+12	18
N. H.	4	25	20	1,642	1,754	+25	— 6	66
N. J.	3	185	191	12,362	12,219	— 3	+ 1	67
N. M.	4	107	102	1,321	1,183	+ 5	+12	12
N. Y.	3	435	448	54,443	49,384	— 3	+10	125
N. C.	2	159	151	2,711	2,641	+ 5	+ 3	17
N. D.	4	20	25	535	491	—20	+ 9	27
Ohio	4	567	583	23,493	23,191	— 3	+ 1	41
Okla.	4	195	194	4,196	4,049	+ 1	+ 4	22
Ore.	4	120	121	4,589	5,080	— 1	—10	38
Pa.	3	360	389	17,811	19,479	— 7	— 9	49
R. I.	2	9	6	1,190	1,120	+50	+ 6	132
S. C.	4	229	205	3,441	3,741	+12	— 8	15
S. D.	4	37	41	717	705	—10	+ 2	19
Tenn.	4	184	226	4,005	3,441	—19	+16	22
Texas	4	726	787	19,656	18,874	— 8	+ 4	27
Utah	2	28	26	689	702	+ 8	— 2	25
Vt.	4	30	25	851	773	+20	+10	28
Va.								
Wash.	4	144	134	6,940	6,853	+ 7	+ 1	48
W. Va.	4	136	117	2,223	2,264	+16	— 2	16
Wis.	3	181	175	5,230	4,902	+ 3	+ 7	29
Wyo.	4	39	42	597	539	— 7	+11	15

*Rural injuries only.
**Death and injury totals cover the months reported by all states, as indicated in this column.

Alcohol and Traffic *(From Page 9)*

throughout the State of Maryland by the Department of Post Mortem Examiners in 1953. . . . Some evidence of alcohol, including amounts less than 0.15 per cent, was found among 6 out of 10 of all cases, and among 7 out of 10 pedestrians."

Holcomb in 1938 showed that 47 per cent of the drivers involved in personal injury accidents had been drinking, and Forrester in 1956 showed that 63 per cent had been drinking. Heise writes, "My own studies and those of all others who have surveys indicate that alcohol plays a part in about 50 per cent of all accidents involving injury and death."

Drinkers' Accident Rate High

While it is perfectly possible that a drinking driver may be involved in an injury producing accident, and the alcohol be no more responsible than it was in the accident occurring to the non-drinking driver, yet it is significant that almost every survey shows that about 12 per cent of the driving population has had a drink or two (or more) and *is responsible for about half the injury producing accidents!*

The United Press report of the speech to the National Tavern Owners convention declared: "Emotional, unscientific approaches to the role alcohol is alleged to play in auto accidents can only delay a solution to this problem."

How right that is! The emotional, unscientific approach has so delayed the solution that today, 20 years after the "under the influence" legislation came into being, the number of motorcar fatalities is greater than ever before. In the figures collected by the National Safety Council, the drinking driver "under the influence"—with a blood alcohol of 0.15 per cent or more—kills only a fourth or a third as many people as does the drinking driver who is technically not under the influence.

The clear-headed, scientific approach demands that we make it illegal for a person to drive or operate a motor vehicle with a blood alcohol concentration of 0.05 per cent or more.

At a recent meeting, a committee of one of our large national medical bodies, assigned to the study of the traffic safety problem, passed unanimously the following resolution and accompanying statement:

"It is the opinion of this committee that it should be unlawful to drive

June 1st was International Traffic Safety Day in Belgium, France, Luxemburg and Germany.

a motor vehicle with an alcohol blood level of 0.05 per cent or greater on public roads.

"This resolution was passed after consideration of the following evidence. One, that the best kept statistics indicate that approximately 50 per cent of the fatal accidents involve a drinking driver. Two, that the average individual with a blood level of 0.05 per cent alcohol or higher suffers deterioration of his driving skill. In other words, last year some 21,000 people died and some 800,000 people were injured by drinking drivers.

"The Committee was not concerned as to whether this blood level is reached on an ascending or descending curve of intoxication. It was not concerned with either the kind of alcoholic beverage consumed, the rapidity of consumption, or whether consumed on a full or fasting stomach. It was not concerned as to whether the *prima facie* evidence available at the time of the accident indicated whether the suspect was intoxicated or not. It was not concerned whether the individual was an experienced drinker with a high degree of tolerance or a beginner.

"It was concerned with the fact that no one is safe when meeting a driver on the highway with 0.05 per cent or higher alcohol concentration in his blood.

"The Committee feels that the method of testing should be determined by the chemists. It also feels that the legal profession and the legislators should make the accepted test mandatory and that its results be accepted as evidence. It further feels that the penalties of driving with such a blood level should be severe, impartially applied, and carry at least a one-day mandatory jail sentence. If separate licenses are granted for the operation of private vehicles, commercial vehicles and passenger vehicles, then in hardship cases, only the private license could be revoked or suspended.

"Since the average man can consume two average drinks of average proof whiskey in an average period of time without reaching this blood level or suffer deterioration of his driving skill, and since such a law would eliminate the present state of confusion as to what "under the influence" signifies, it seems reasonable to establish the blood level figure of 0.05 per cent or higher as the critical level for the safe driving of a motor vehicle on our public roads."

Statistics Exaggerated Downward

Here is the more thorough investigation called for by the Licensed Beverage Industries. It shows clearly that the statistics were "exaggerated," but they were exaggerated downward rather than upward.

The liquor industry and the Licensed Beverage Industries can bring their considerable influence to bear upon the legislatures of this country to urge the creation of legislation that will *hasten* the solution of this problem; to bring into being legislation, police practices, and public support that will make it illegal to drive a motorcar with blood alochol of 0.05 per cent or more. Let their full-page newspaper ads and the billboards across the country attest to the sincere desire to help in the solution of this problem. They have the resources and the opportunity. END

SUPERHIGHWAYS or

With Planned Access — beauty, speed, safety

by James D. Saul

THE gigantic federal-state highway building program is ready to roll. Surveyors are sighting through their transits, contracts are being drawn, bulldozers and draglines are even now gouging out the earth in many localities.

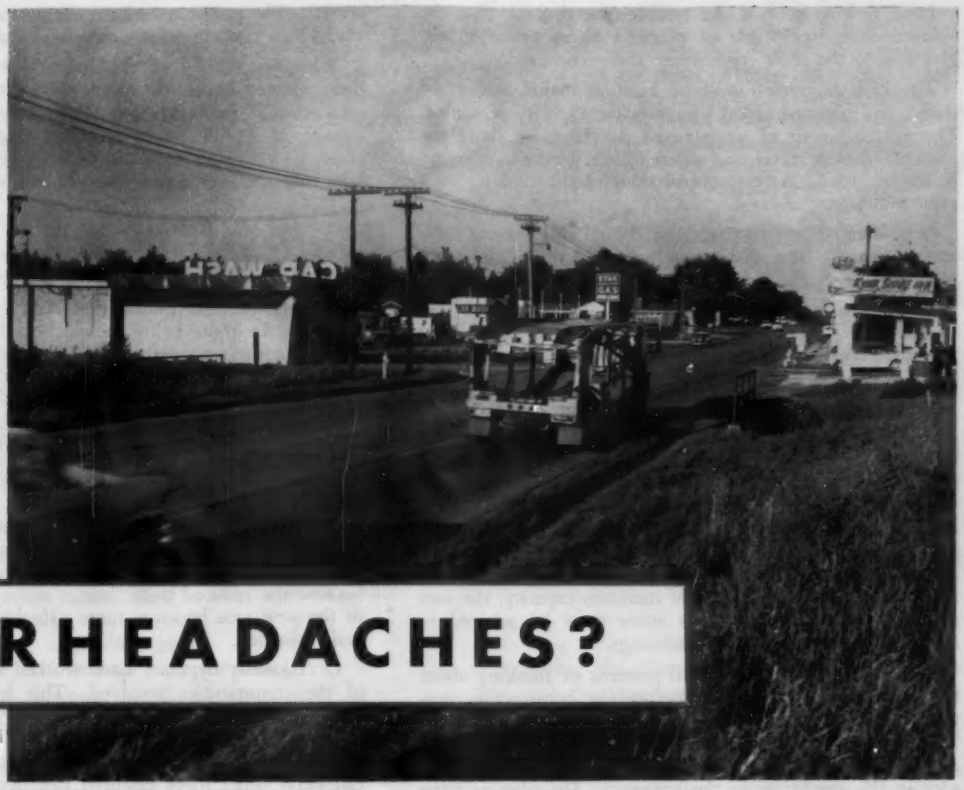
Will we have the 41,000-mile system of interstate and defense highways in the target time of 13 years laid down by the federal act? Already the Byrd amendment has had the practical effect of extending the completion time to 15 or 16 years. But that is a money matter. Far more serious in its potential to hamper and delay the program is the lack of understanding and acceptance by the public of many new features of the highway plan.

This is a construction job almost 60 times bigger than the Panama Canal. Yet almost anyone, from a stubborn farmer to a bloc of businessmen, can wave a red flag of objection and slow down the project.

Section 116 of the Federal-Aid Highway Act of 1956 says the voice of the people shall be heard. Before the Commissioner of Public Roads can approve any federal-aid highway project that bypasses or goes through a community, he must see that public hearings are held.

This is all democratic and proper as long as those attending the hearings really represent the interests of the locality. But if history repeats itself, as it usually does, it will be the "agin's" who turn out and give loud cry to protests that they will be hurt by the new location, or by the planned access provisions of the law. The transcript of the hearing sent to the Bureau of Public Roads should present both sides of the story. The only way to insure that federal administrators will get a balanced picture is for public support groups to give the proposals equally vigorous backing.

Officials can expect attempts by minority groups to influence the location of the route, to violate the principle of access control, or to sidetrack funds to secondary roads. Such moves against the public interest must be met by a vigorous, informed public opinion.



SUPERHEADACHES?

Without Planned Access — squalor, delay, tragedy

Naturally, a businessman who thinks the new roads are roads to ruin for him can be expected to fight for his investment. He has a "good location." Location and traffic volume have been synonymous for so many years that any move to relocate traffic looks like a detour of dollars to the owner of the business. This thinking is a holdover from the days before our millions of cars and trucks began to congest the streets and strangle the businesses built close to the traffic.

What actually happens when a town gets a bypass ("relief route" is a more accurate term) is this: the through traffic goes around the town. Those who don't want to be in the town—who want to move past it as rapidly as possible—stay out of it. Those who do want to be in the town no longer hesitate to enter its traffic arteries for shopping or other purposes. The bypass loosens the traffic tourniquet for the "live ones."

Progressive businessmen know this, but federal-aid highways will try to push through many localities where traditional thinking dominates. Officials and public support groups must be prepared to meet the old arguments, telling the story again and again in thousands of communities to prevent uninformed opposition to the new highway program.

The vital first step—acquisition of right-of-way—is a long, involved process in most states today. Old-timers can remember when farmers donated strips of land for roads because they were so grateful to be rescued from the mud. It is an understatement to say things are different now.

Acquisition laws are remarkable for their lack of uniformity. What is needed is a law that will enable a state to take immediate possession. The federal government can take immediate possession, but it would be cheaper, and would ruffle fewer feelings, to keep the condemnations at the state level. The New York acquisition law does the job this way: state men survey, file plats and condemnation notices, and the land becomes state property. The fine points are hammered out later. In the meantime, no building goes on, and the price does not skyrocket.

Land procurement is one troublesome problem, but the modern design principle of planned access probably will give rise to the most controversy and recrimination.

The new highways must be built as major carriers of traffic, and planned access preserves the capacity of a road. The encroachment of unrestricted development along the roadside chokes travel and often makes it necessary to relocate the road. Access control doubles the capacity of a rural highway.

Well-marked service roads can funnel shoppers to commercial areas. The distinction must be made clear—no road can serve efficiently as a major artery and as a service road.

General Welfare Demands Control of Access

The traditional right of owners of adjacent land to enter and leave at will has become a casualty of the motor age. Property owners may inveigh bitterly against such limitation on traditional rights, but the fact remains that the safety and capacity of the modern express highway permits no compromise with this principle. The roadside developments resulting from uncontrolled access have proved so hazardous that the general welfare demands control of access. When a road closed in by ribbon development must be widened to maintain capacity, the cost is often so high that a new route must be selected to avoid condemning valuable buildings.

If officials are to change old patterns of thinking about highways in the short time before the construction program picks up momentum, they will need public support. The one sure way to build it is to inform the public fully of the advantages to be gained by following sound principles in the execution of the program. The plan and the money are not enough. Public understanding is also essential. The public must be made aware of the self-evident truths that traffic professionals have known for years.

What are these truths? One of the most persuasive is that planned access is safer. Many of the fatalities on conventional roads are caused by improper design. The Bureau of Public Roads made a study of thousands of accidents on more than 2,000 miles of highway. Here is how the rate goes down when control of access is applied:

	Accidents Per 100,000,000 miles
No access control	429
Partial access control	296
Full access control	168

Owners of real estate along an existing route often object to the route being moved because they think it will depreciate their property. In Camarillo, Calif., a town of 5,000, a state route was moved from the main street to another location near the center of the community. Real estate values, rather than decreasing, increased from $36 to $110 per front foot along the old route.

Bypass Need Must Be Proved

The record shows that property values both in the area bypassed and in the area near the bypass are increased. The property in the bypassed area becomes more valuable because the reduced traffic brings easier shopping, and that in the new area becomes more valuable because it is more easily reached.

Occasionally bypasses have worked to the disadvantage of the communities involved. This has happened where there was no need for the bypass. Premature bypassing, or wrong placement of a bypass, can cause some decline in business activity. Funds used for an unneeded bypass can delay other more essential improvements.

The larger the city, the less it needs bypassing. Only a

SHOPPING AREAS ARE USUALLY NEARBY

The average driver can't take all that lonesome road . . . likes to get into town occasionally.

FOOD AND GASOLINE ALWAYS JUST AHEAD

Where planned access highways are laid out between towns, rest stops are built into the route.

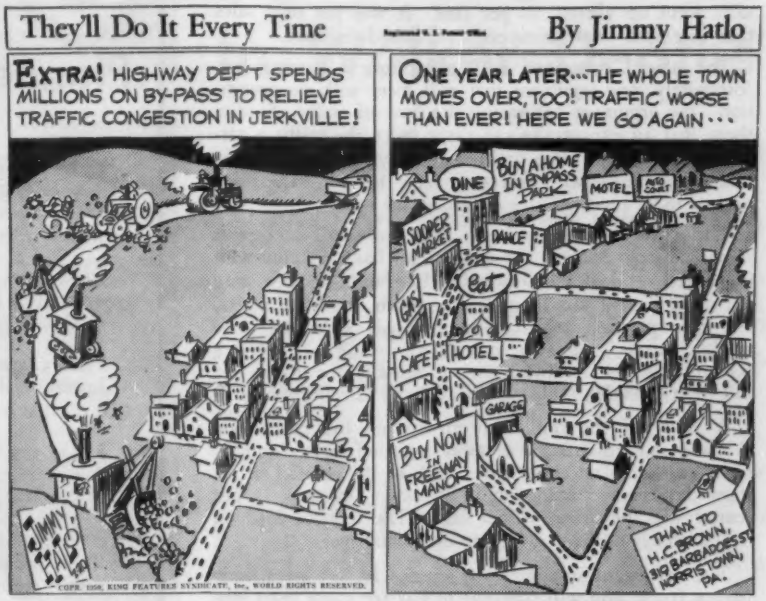
small amount of the traffic toward a large city is through traffic. Considering two cities of medium size, one near a larger city and the other more distant from a large population center, the one near the larger city will need a bypass more than the other. When doubt arises, traffic surveys are the answer.

Bypasses usually benefit the established, stable business houses, while those injured are likely to be the more insecure types. A good business, regardless of location, is based upon sound business principles and an established clientele, not upon transient traffic. The businessman who makes it easy to reach his store and to park near it will keep his customers. On the other hand, the businessman who depends upon the impulse of a passing motorist can expect only one stop. Some businesses built entirely on through traffic may suffer, but not always.

In Atlanta, Ga., five motels were bypassed by a new freeway. Only one of these was showing a decrease in business at the time their records were checked.

Any disadvantages, however, usually are far outweighed by the benefits which follow construction of a bypass. The tourist trade lost is made up by increased local trade.

Where public policy has run head-on into private interest, the courts have given no comfort to the dissidents. When an attempt was made in Florida to stop construction of a bypass, the Florida Supreme Court denied an injunction with this opinion: "In every county of the state there may be disputes and conflicts of opinion as to whether all state roads should run through the county seat and further congest traffic and wear out the local streets, or whether some of such state routes should bypass the county seats in order to avoid slowdowns occasioned by congested traffic conditions, but such matters do not present judicial questions unless the routing of a road is in direct conflict with the mandates of the legislature."


They'll Do It Every Time
By Jimmy Hatlo
EXTRA! HIGHWAY DEP'T SPENDS MILLIONS ON BY-PASS TO RELIEVE TRAFFIC CONGESTION IN JERKVILLE!
ONE YEAR LATER···THE WHOLE TOWN MOVES OVER, TOO! TRAFFIC WORSE THAN EVER! HERE WE GO AGAIN···
DINE
BUY A HOME IN BYPASS PARK
MOTEL
SOOPER MARKET
DANCE
Eat
GAS
CAFE
HOTEL
GARAGE
BUY NOW IN FREEWAY MANOR
THANK TO H.C. BROWN, BIG BARBAGOSS, NORRISTOWN, PA.
JIMMY HATLO
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PUBLIC HEARINGS GIVE EVERYONE A CHANCE TO SPEAK UP

When people can have their questions answered, they are more likely to get behind the program and support planned access.

The strongest argument for bypasses can be presented from case histories of increased business activity after their construction. Sales tax payments before and after bypassing provide good comparisons.

The most thorough studies of bypass effects have been made by the California Division of Highways. In nine California cities, business was down 9 per cent in one city and up in the others—up as much as 132 per cent in one city.

Two hundred businesses, all along a four-mile strip bypassed in North Sacramento, Calif., were studied for the effects of decreased traffic. After the bypass opened, traffic dropped 44 per cent, but in the next two years total retail sales went up almost 50 per cent. It was not only sales that increased —new businesses continued to open.

sales went up almost 50 per cent. It was not only sales that increased—new businesses continued to open.

The official concerned with expediting a hearing has, fortunately, one argument that will meet with no opposition—the argument for easing the flow of traffic. Studies show that an expressway can carry twice the traffic a surface street of the same width can carry. The expressway traffic will move twice as fast at half the cost. The users will be three times as safe as on surface streets.

The word "bypass" probably needs replacing because it is misleading. Already the semanticists have tinkered with the adjective describing access to take some of the sting out of it. First it was limited access, then controlled access, and now planned access is the favored expression. The world "bypass" seems to connote something left bobbing forlornly in the backwash, when actually the routes we call bypasses serve as distributors as well as relief routes.

A study of the traffic pattern around the Hollywood Freeway showed that the freeway attracted traffic from arteries two miles on either side. Each of the parallel streets showed a marked reduction in volume. One was 22 per cent down, the other 34 per cent. The reduced load on city streets is a direct saving to every taxpayer.

The new highway program is under way. We are already paying for it, and will continue to pay for many years into the future. Delays only cost more money. The smart taxpayer can make sure he gets his money's worth by supporting officials who are determined to buy the most road for the money. That means planned access. END

Planned Access Highways Are:

SAFER—sudden, direct entry is impossible . . . national figures show that two out of three killed on roads with unlimited access need not have died.

CAPACIOUS—a controlled access road has greater capacity, and *keeps* it . . . it can carry twice as much traffic as a conventional road of the same width.

PERMANENT—the very encroachments that choke a conventional highway make widening so expensive that it often must be relocated.

ECONOMICAL—a motorist can travel a mile on the rubber required for one start and stop; two city blocks on the gasoline used.

ATTRACTIVE—substantial businesses are attracted to the access points, shabby eyesores that plague conventional roads are prevented.

FASTER—no red lights, no stop signs, no traffic delays.

Tools for the Job

Freedom of the American Road: 120 pages, 46 stories of how others did the job, Ford Motor Company, 3000 Schaefer Road, Dearborn, Mich.

What Freeways Mean to Your City: 48 pages, experience of 15 cities with limited access, Automotive Safety Foundation, 200 Ring Building, Washington 6, D. C.

Businessmen's Guide to the Road Program: 30 pages, statements by national highway authorities, Chamber of Commerce of the United States, Washington 6, D. C.

How Bypasses Affect Business: 24 pages, a clear statement of the true effects of bypasses, Chamber of Commerce of the United States.

Your State May Block New Roads: 6-page reprint from *Nation's Business* magazine, September, 1956, how the road program could run into trouble, *Nation's Business,* 1615 H Street N. W., Washington 6, D. C.

The New America That's Coming: 112 pages, special report by the editors of *Automotive Industries* magazine on the impact of the program on industry, commerce, and vehicle design, The Chilton Company, Inc., Chestnut and 56th Streets, Philadelphia 39, Pa.

The Road Ahead: 24 pages, a public support booklet written for the individual citizen, Caterpillar Tractor Co., Peoria, Ill.

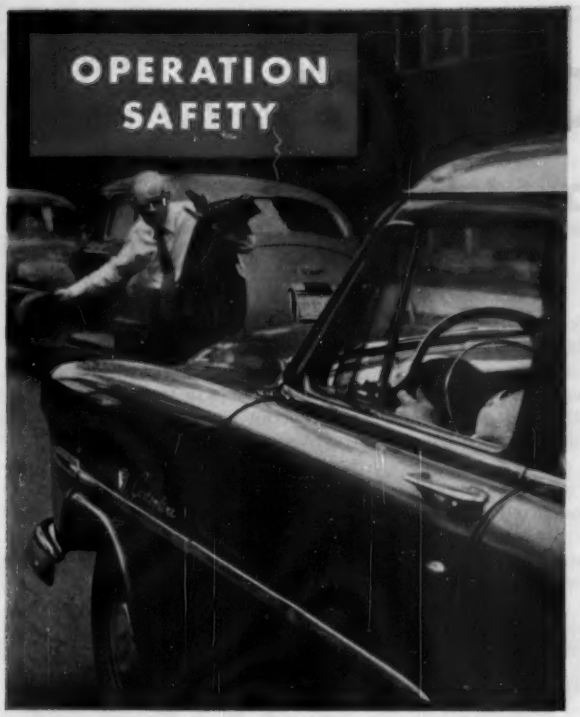
The New Super-Highways: Blessing or Blight?: 5-page reprint of *Harper's Magazine* article by Robert Moses, Harper and Brothers, 49 E. 33rd, New York 16, N. Y.

Let's Build Safety Into Our Highways: 6-page reprint from *Public Safety* magazine, Senate testimony of Sidney J. Williams, NSC, and Carl E. Fritts, ASF, National Safety Council, 425 N. Michigan, Chicago 11, Ill.

Controlled Access Highways: 3 pages, mimeographed, Section VII of NSC's Speed Regulation report, National Safety Council.

A Brief Summary on Freeways: 4 pages, mimeographed, a summary of *What Freeways Means to Your City,* National Safety Council.

Film (title not available): Intended to reassure taxpayers, demonstrate new roadbuilding techniques, prove public benefits, and highlight economic impact of planned access highways. Ready in October. American Road Builders Association, World Center Building, 918 16th St. N. W., Washington 6, D. C.



Age — Big Factor In Walker Deaths

7,950 pedestrians were killed in traffic accidents last year. 4,850 of these were over 45, 3,000 of them over 65. Age increases a person's chances of being hit in traffic and it decreases his chances of surviving his injuries.

THESE ARE the hard, cold facts about pedestrian fatalities—at 45 vulnerability in traffic starts increasing . . . at 65 walking in traffic is a major hazard . . . the non-driver is much more likely to end up as a statistic than the person who drives.

Why?

The reason for the older person's traffic problem is obvious. Age increases vulnerability because as people grow older they slow down . . . become less alert to danger and don't react to it quickly. By the time they reach the 65-year mark, many persons suffer from impaired sight or hearing, a crippling ailment or other physical handicaps.

These disabilities are major traffic hazards.

And the Non-drivers?

The non-driver's handicap is also easy to understand. The person who does not drive is unaware of the mechanics of a vehicle and of the limitations of the driver. Non-drivers cover the entire age cycle—from pre-school tot to octogenarian.

This fact is a valuable clue to the prevention of pedestrian traffic deaths.

If you can get the pedestrian to realize that he can't count upon the driver's capabilities and must look out for his own skin, you've done about 50 per cent of your educational job.

The other half of the job consists in teaching the motorist that the pedestrian has no appreciation of the driver's problems and is relying solely on the motorist's judgment.

Well-Rounded Program

Add to this educational program a realistic system of signs, markings and other physical protection and a strict enforcement policy toward pedestrian and driver violations and you have a well-rounded pedestrian program that will pay off in precious lives.

Such a program can well be the starting point in your whole traffic safety effort. When you attack the pedestrian problem, you attack a major factor in the overall traffic toll.

In addition, a program which educates the pedestrian educates everyone, because everyone is a pedestrian most of the time. Also, this program builds an awareness of basic traffic principles that will carry over into other emphasis programs.

PEDESTRIAN PROTECTION
Operation Safety
Theme for November

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PEDESTRIAN CONTROL

Key to City Traffic Problem

The pedestrian problem is one of traffic's biggest headaches. City after city, following careful study of the traffic picture, has turned its guns first on pedestrian accidents. Why? Because good pedestrian programs pay off in slashed tolls.

THE first recorded traffic death in this country was a pedestrian struck after he had alighted from a streetcar. Pedestrians have been getting killed in traffic ever since.

In cities of moderate size about half of all traffic fatalities involve pedestrians. In general, the larger the city the larger the percentage of pedestrians involved. Even in rural areas, pedestrian traffic fatalities are high.

Whenever a pedestrian is struck by an automobile, public sympathy is always on the side of the pedestrian. The facts in the case do not always warrant this sympathy. Frequently, the pedestrian himself is largely to blame for the accident.

Realizing this, many communities have realistically conducted pedestrian programs in which control of the walker himself was the major factor. Such programs, when carefully planned and carried out on a continuing basis, drastically cut the traffic toll and greatly relieve congestion.

Most successful pedestrian programs depend on the time-tested three-pronged approach — engineering, enforcement, and education.

What does the engineer contribute to a pedestrian program?

He's the man who decides where to use painted or marked crosswalks, overpasses and underpasses, pedestrian islands, pedestrian barriers, and that important one-way traffic which eliminates about 50 per cent of the pedestrian-vehicle conflict. He's also responsible for providing adequate illumination — an important factor in the night safety of pedestrians.

The importance of enforcement cannot be over-emphasized in the pedestrian picture. Enforcement includes having a pedestrian ordinance and enforcing it.

The public does not readily take to pedestrian restrictions, so any attempt in this direction will fail if not preceded by a good publicity build-up. Even with publicity, strict enforcement should be preceded by several weeks' warning.

The handling of driver enforcement

OAKLAND'S PEDESTRIAN CAMPAIGN

For several years Oakland, California, has carried on a successful pedestrian safety campaign. Oakland officials believe the following tips, based on their city's experience, may be helpful to other communities planning similar programs.

- **Police can profitably use loudspeaker cars to warn violators before the actual enforcement starts.**
- **Allow at least one month for newspaper, TV and radio programs to outline the need for and the advantages to be gained from enforcement of pedestrian laws.**
- **Use the second month for additional publicity. During this month the police can issue warning jaywalking citations.**
- **Give as many talks as possible to service clubs and other local organizations to explain and sell the program.**
- **Have the local safety council provide "Don't Jaywalk" bumper strips.**
- **Use Boy Scouts and similar groups to distribute pedestrian safety pamphlets.**
- **A mock jaywalker's court, held on a traveling truck touring all the business areas in town, can build much support for the program.**

during a pedestrian campaign is a ticklish problem. There should be strict enforcement, of course, but too much publicity on this angle may give some pedestrians the idea that they are getting extra protection and can afford to take chances. On the other hand, drivers might misinterpret the pedestrian enforcement campaign as an excuse for disregarding pedestrian safety.

The success of engineering and enforcement measures depends to a great extent on the kind and amount of publicity they receive. The best pedestrian protection devices will fail if walkers don't know how to use them or don't realize the importance of using them. They must also be convinced that pedestrian ordinances are for their protection and should be obeyed.

However, the education arm of the program extends far beyond this auxiliary role. It must teach the pedestrian how to stay safe and the driver how to help the pedestrian stay safe.

Before mapping it out, you must know your problem. Why do pedestrian accidents occur in your community? Studying crash records, digging through the newspaper files, and talking with your local enforcement officials are good ways of getting the information you are after.

But regardless of what your specific problem may be, a large factor in it is bound to be the lack of understanding which exists between drivers and walkers. Many pedestrians are non-drivers and have little conception of the limitations of the motorist or his car.

Less understandable, drivers seem to forget the walker's plight as soon as they slip behind the wheel of a car. You must establish a realistic awareness of the other's problems by each of these two groups.

During November the pedestrian faces special hazards that should be specifically covered in your program. Days are short and nights are long at this time of year, which means that much walking will be done in hours of darkness.

Weather conditions are treacherous as winter digs in, and the pedestrian must realize that his visibility and traction are impaired in snowy, rainy and icy weather. He should also be reminded that the driver's vision and the traction of his vehicle are diminished in inclement weather.

Another threat to safe walking is the early Christmas shopping that starts in November. Holiday preoccupation throws the pedestrian off his guard, heavy traffic increases his danger, and the carrying of stacks of packages often obscures his vision.

The driver, of course, should be warned of the special difficulties that beset the pedestrian at this time of year and of his responsibility to protect the walker.

There are three types of walkers who are sepecially vulnerable in traffic —children, the elderly and the blind.

You can reach children through the schools, through radio and TV programs for children, children's sections in newspapers, and groups such as Boy and Girl Scouts, and Campfire Girls. You can also appeal to parents to teach children safe traffic practices.

Elderly pedestrians move slowly and their reactions are likely to be delayed. They may also suffer from impaired sight or hearing.

Because their activities are restricted, they are also somewhat difficult to reach with the safety message. Pastors, church groups, doctors, TV and radio programs slanted to the elderly, and sections of newspapers of interest to them are your best bets.

Everybody gets into the act

Twice a year volunteers from custom car clubs and other organizations get together to renew pedestrian caution signs at main intersections of the City of Oakland. Oakland's pedestrian campaign, started in 1953, has been an outstanding success. A $2.00 minimum fine or attendance at traffic court for pedestrian violations is still strictly enforced, but nowadays there are few violators. Sponsored by the safety council, this program is an excellent example of community-wide organization. It has used the talents of all interested citizens and groups. The result—a significant cut in the over-all traffic toll.

Helpful Hints for PEDESTRIAN PROTECTION

EACH year thousands of pedestrians literally walk themselves to death.

It is true that in many cases they are given a powerful assist from careless drivers, but the record shows that the pedestrian, himself, is very much to blame.

There are the smart-alecky pedestrians who knowingly take chances. Agile, fast-moving, they'll see a car coming, quickly calculate the risk and beat it by a hair. Sometimes they don't beat it, of course. Those are the smart alecks who become statistics.

Then there are the absent-minded types. Oblivious of their surroundings, they unconsciously walk into danger. They're the ones who daydream themselves to death.

Of special concern are the oldsters who make up the largest segment of fatality lists. They are handicapped by the disabilities of advancing age. They move slowly and react slowly. They are no match for modern traffic.

Youngsters, too, are handicapped in traffic. They don't realize the danger and consequently don't take precautions.

Whatever prompts the pedestrian to take his fatal step, one thing is sure—he does not have a realistic appreciation of his adversary in traffic, the automobile.

It is just as obvious that drivers constantly overestimate the pedestrian's agility and his judgment of car and driver.

Both these deficiencies can be overcome by an educational campaign that stresses the following "musts" for walkers and drivers.

Walkers Must

- **Cross streets watchfully, and at intersections ONLY.**
- **NEVER walk into the street from behind or in front of parked cars.**
- **OBEY traffic signs and signals—cross on GREEN (or Walk) ONLY.**
- **WAIT on sidewalk—not in street—for GREEN light or WALK signal or for gap in traffic if intersection has no traffic signal.**
- **Cross streets in crosswalks—do NOT cross intersections diagonally.**
- **LOOK left and right for traffic while crossing. Watch sharply for turning cars. Step up watchfulness at night.**
- **Be especially careful at one-way street crossings to check the directions of approaching traffic.**
- **Never go around a bus or street car, front or rear, after alighting from it. WAIT till it leaves before crossing the street.**
- **Never rely on drivers' seeing you—especially on poorly lighted streets or in roadways at night. At night carry a flashlight; wear light-colored or reflectorized clothing; or carry something white or reflectorized.**
- **FACE traffic and walk on LEFT while walking in areas where there are no sidewalks.**

Drivers Must

- **Stop at crosswalks for pedestrians.**
- **Stay well behind the line until the signal changes when stopped at a crosswalk.**
- **Never jump the gun when the signal changes. Give walkers a break.**
- **Be sure the crosswalk is clear before making a turn.**
- **Be especially alert when approaching blind intersections or line of parked cars.**
- **Watch out for youngsters and oldsters.**
- **Be especially watchful at night.**

THE PEDESTRIAN PICTURE

In urban areas about half of the fatal motor vehicle accidents involve pedestrians. In rural areas about one fatal accident in 10 involves a pedestrian.

WHO?

Seven thousand nine hundred fifty pedestrians were killed in traffic accidents in 1956. One hundred twenty-five thousand others were injured.

	0-4 Years	5-14 Years	15-24 Years	25-44 Years	45-64 Years	65 Years and Over
Killed	650	1,150	350	950	1,850	3,000
Injured	15,000	45,000	10,000	15,000	20,000	20,000

WHERE?

Of the deaths, 5,100 occurred in urban areas and 2,850 in rural areas.
Of the injuries, 115,000 occurred in urban and 10,000 in rural areas.

HOW?

Out of 100 pedestrians killed in *urban* areas:

- **10 were crossing at an intersection *with* the signal**
- **5 were crossing at an intersection *against* the signal (fewer pedestrians expose themselves in this way, hence this seemingly low figure.)**
- **24 were crossing at an intersection where there was *no* signal**
- **3 were crossing at an intersection *diagonally***
- **35 were crossing *between* intersections**
- **23 were killed in other actions**

Out of 100 pedestrians killed in *rural* areas:

- **1 was crossing at an intersection *with* the signal**
- **Less than 1% was crossing at an intersection *against* the signal**
- **8 were crossing at an intersection where there was *no* signal**
- **1 was crossing at an intersection diagonally**
- **45 were crossing *between* intersections**
- **19 were walking in the roadway**
- **26 were killed in other actions**

Out of 100 pedestrians injured (both urban and rural):

- **33 were crossing at an intersection**
- **32 were crossing between intersections**
- **16 were coming from behind parked cars**
- **3 were walking in roadway**
- **2 were working in roadway (including pushing or repairing vehicle)**
- **6 (children) were playing in the roadway**
- **1 was hitching on to a motor vehicle**
- **1 was standing in safety zone or roadway**
- **4 were not in the roadway**

Among adult pedestrians involved in fatal accidents, 22 out of 100 had been drinking.

NOVEMBER PROGRAM AIDS

Films, booklets and other aids for your Pedestrian Protection program

The films listed below were selected from the "National Directory of Safety Films" (1956 Edition), which may be purchased from the National Safety Council (Price: $1.00). For local film sources write to your state and local safety councils, state safety departments, the film libraries (if any) at your state colleges and universities, and the film department of your state library.

FOOT FAULTS (16mm sound motion) b&w. 11 min. Aimed at the careless pedestrian, it illustrates how to prevent traffic accidents through safe walking practices. The Princeton Film Center, Princeton, N. J. Rental.

HEEDLESS HURRY, ENDLESS WORRY (16mm sound motion) b&w. 10 min. The main theme is pedestrian safety although safe and unsafe driving practices are also illustrated. American Film Registry, 24 E. Eighth St., Chicago 5, Ill. Rental.

PEDESTRIAN SAFETY (35mm sound motion) b&w. 10 min. A Pete Smith Specialty proving the "pedestrian is always (?) right." Stresses the safe practices that must be followed when walking. For theatre use only. Metro-Goldwyn-Mayer, 1540 Broadway, New York 19, N. Y. Purchase and rental.

THE RUN DOWN (35mm sound slidefilm) b&w. 15 min. Begins with a hit-and-run case then illustrates unsafe acts in walking. Your local Zurich Insurance Co. agent or write to Zurich Insurance Companies, 135 S. La Salle St., Chicago 3, Ill. Loan.

X MARKS THE SPOT (16mm sound motion) b&w. 20 min. A story of a somewhat whimsical driver and a pedestrian and their common experiences in traffic. Cleared for TV. New Jersey Department of Law and Public Safety, Bureau of Traffic Safety, State House, Trenton 7, N. J. Purchase and loan.

Film Trailers

One-minute film trailers prepared especially for Operation Safety and the National Safety Council include the following:

FATAL STEPS (OST—1—5111). Pedestrians who cross streets without looking invite accidents.

THE AGE OF DANGER (OST—1—1). An elderly man in a hurry—a rush to catch a bus—another traffic tragedy.

SAVE A LIFETIME (OST—1—12). A question for all pedestrians: Is the gamble of your life worth the extra minute you MAY save?

All film trailers are in sound, black and white and one minute in length.

Newspaper Ads

A new series of newspaper mats on the theme of traffic safety has been designed for business concerns who wish to use traffic safety messages in their advertising. Available in full-page, 1,000-, 600-, 200-, and 100-line sizes. For complete information and ad proofs, write the Advertising Council, Special Service Office, 425 N. Michigan Ave., Chicago 11, Ill.

Information on imprinting posters and leaflets and prices for film trailers with standard or special tailpieces may be obtained by writing to NATIONAL SAFETY COUNCIL, 425 N. Michigan Ave., Chicago.

Outdoor Advertising

The Mass Marketing Institute, 830 N. Wabash Ave., Chicago 11, Ill., has available outdoor 24-sheet posters, which do an excellent publicity job. Many business firms are receptive to the idea. Write to Mass Marketing Institute for the name of the Outdoor Advertising company serving your area.

Publications

The following publications are available from the National Safety Council:

SAFETY EDUCATION DATA SHEETS. Two to six-page reprints from *Safety Education* magazine giving practical information on accident hazards. Data sheets related to Pedestrian Protection are No. 10—"Pedestrian Safety," No. 38—"Railroad Trespassing," and No. 58—"Winter Walking." (Stock No. 429.04)

SAFETY INSTRUCTION CARDS. Three by five cards giving instructions on pedestrian safety. No. 327—"Children and Traffic" and No. 313—"Pedestrian Traffic Safety." (Stock No. 191.04)

National Pedestrian Program Materials. Each year the American Automobile Association sponsors a "National Pedestrian Program" which is designed to encourage pedestrian safety. The contest is open to both cities and states. For information write to AAA, 1712 G St., N. W., Washington, D. C.

FREE OPERATION SAFETY MATERIALS

Basic aids to help you launch a successful campaign

TO DO the Operation Safety job thoroughly, you need all the tools. News releases, radio scripts, samples of leaflets and newspaper mats—formerly distributed in the Operation Safety kit—can be obtained by checking the Operation Safety box on the Reader Service Card contained in this issue of TRAFFIC SAFETY.

Here's what you get:

▸ **Four News Releases**—designed to feature local personalities and to highlight local conditions. Written by professional journalists, these releases point up the responsibility of each citizen to cooperate in the traffic safety program.

▸ **Four Radio Scripts**—five-minute, interview-type scripts on the pedestrian safety theme. Each spotlights an appropriate local personality and is written for easy adaptation to local traffic situations. Scripts are tailored to fit the requirements of local stations.

▸ **Newspaper Mats**—a sample of each of the featured mats on the pedestrian protection theme. Designs are one-column miniatures of the featured poster designs shown on page 45.

▸ **Leaflets**—samples of the three featured leaflets illustrated on page 45. These handy, pocket-size giveaways tell a brief but hard-hitting traffic safety story in a way that captures interest. Properly distributed, they can serve as star salesmen for your pedestrian protection program.

▸ **Smart Headwork**—Four color, 16-page booklet on pedestrian safety. Sprightly, cartoon-type illustrations of typical traffic situations enliven the text.

OPERATION SAFETY MATERIALS

TRAFFIC PUBLICATIONS

SMART HEADWORK FOR LIFESAVING FOOTWORK (339.52) A quick traffi-quiz that helps to educate the entire family. Prices: 1-9, $0.15 ea.; 10-99, $0.09 ea.; 100-999, $0.06 ea.; 1,000-4,999, $0.045 ea.; 5,000-9,999, $0.04 ea.; 10,000-19,999, $0.035 ea.; 20,000 or more, $0.032 ea.

BACK THE ATTACK—CLOSE RANKS (397.12) Helps to gain support for public traffic agencies. Sold in packs of 1,000(m)only. Prices: 1-9m, $6.70 per m; 10-99m, $5.70 per m; 100-999m, $5.00 per m; 1,000m or more, $4.50 per m.

THE CASE OF THE PERSISTENT PEDESTRIAN (391.56) **DO A GOOD TURN—WAIT** (391.45) Operation Safety Leaflets that point out those often "taken for granted" driving habits. Sold in packs of 100 for $2.50 per pack. Sold in packs of 1,000(m): 1-4m $20.00 per m; 5-9m, $18.00 per m; 10-19m, $16.00 per m; 20-99m, $14.00 per m; 100-199m; $12.00 per m; 200m or more, $10.00 per m.

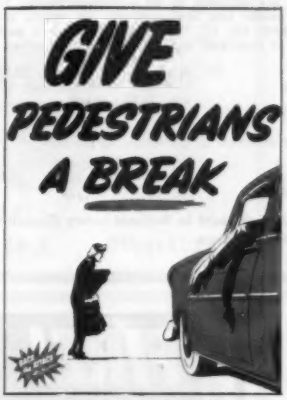
ALL PRICES SHOWN ARE SUBJECT TO A DISCOUNT OF 10% TO NATIONAL SAFETY COUNCIL MEMBERS.

TRAFFIC POSTERS

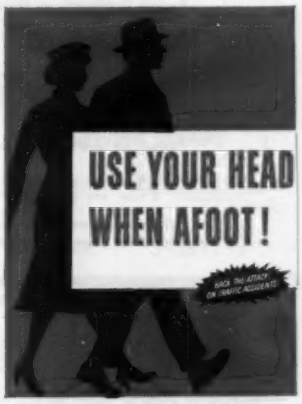
PEDESTRIAN POSTERS

FOR NOVEMBER SHOWINGS

Imprint Deadline, September 15, 1957



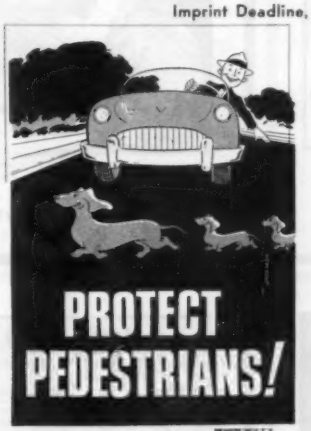
T-1169-C 25"x38"
T-1170-A 8½"x11½"



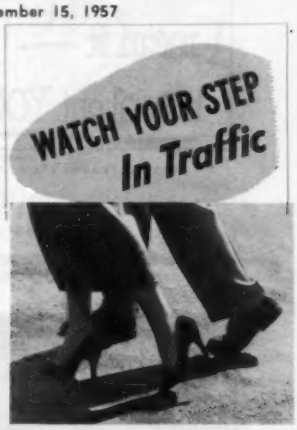
T-1171-B 17"x23"

ALTERNATE NOVEMBER POSTERS

Imprint Deadline, September 15, 1957



T-0805-C 25"x38"
T-0806-A 8½"x11½"



T-0804-B 17"x23"

PRICES FOR ABOVE POSTERS

Traffic Posters—T-prefix to number

	1-9	10-99	100-999	1000-4999*
A Size	$0.15	$0.092	$0.063	$0.052
B Size	.25	.18	.15	.12
C Size	.35	.27	.22	.20

YOUR CREDIT LINE can be imprinted (at the time of the press run) on B and C posters only. A minimum of 45 days prior to the first of the month of posting is required on all orders for imprinting.

*Write for prices on quantities of 5,000 or more or for special rates on annual poster orders. 1 column newspaper mats on these posters are available from the National Safety Council.

FLEET POSTERS

POSTER PRICES

Posters illustrated on these pages are included in the automatic Motor Transportation poster services. Automatic poster sets are available on yearly subscription that provides (4) subjects per month viz. (2) "A" size (8½"x11½") and (2) "B" size (17"x23"). Automatic service is provided in the following categories:

City Truck	City Bus	Annual price 1-4 sets, $8.85 per set;
Intercity Truck	Intercity Bus	5-49 sets, $7.45 per set; 50 or more
Sales Truck	Taxicab	sets, $5.95 per set.
Truck Terminal	Bus Terminal	

Posters are available for individual selection at the following prices:

	1-9	10-99	100-999	1000-4999*
A size, any selection	.15	.092	.063	.052
B size, any selection	.30	.22	.185	.15

All prices shown are subject to a 10% discount to National Safety Council Members.
*Write for prices on quantities of 5,000 or more.

POOR JUDGMENT
Results in Accidents!

©NATIONAL SAFETY COUNCIL

0879-A **8½x11½**

©NATIONAL SAFETY COUNCIL

1045-B **17x23**

©NATIONAL SAFETY COUNCIL

0814-A **8½x11½**

NATIONAL SAFETY COUNCIL

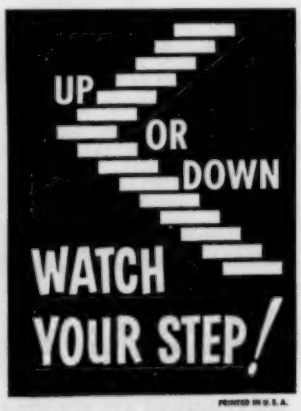
V-9799-A **8½x11½**

NATIONAL SAFETY COUNCIL

0746-B **17x23**

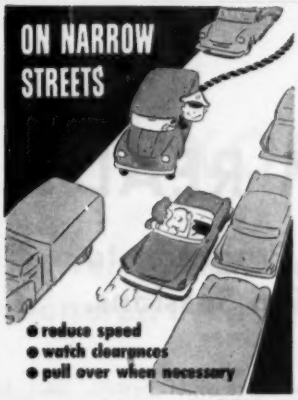
©NATIONAL SAFETY COUNCIL

1007-B **17x23**



©NATIONAL SAFETY COUNCIL

1060-A **8½x11½**



V-1151-A 8½x11½

V-1148-A 8½x11½

V-1149-A 8½x11½

V-1150-A 8½x11½

V-1147-A 8½x11½

V-1154-A 8½x11½

V-0525-B 17x23

WHAT'S YOUR DRIVING IQ?
DO YOU always look before leaving curb?
DO YOU give the right of way to pedestrians?
DO YOU really stop at stop signs?
DO YOU use extra caution at railroad crossings?
STOP
RAIL ROAD CROSSING

V-9335-B 17x23

V-0264-B 17x23

CONGRESS PROGRAM READY

Commercial Vehicle and Transit Section Programs to Feature Workshop and Driver Supervision Sessions.

A PANEL of medical experts discussing the physical, visual, and emotional factors in driver selection will be a feature of the Commercial Vehicle section program, October 22-24, at the 45th National Safety Congress and Exposition in Chicago, announced Program Chairman L. F. Purves, fleet superintendent of the *Toronto Star*, Ltd., Toronto, Canada.

The panel will include Dr. Eugene P. Owen, president, Northwest Association of Occupational Physicians, Portland, Ore., speaking on "Physical Factors;" Dr. Brittain F. Payne, clinical professor of Ophthalmology, New York University Post Graduate Medical School, discussing "Visual Factors," and Dr. Eugene S. Turrell, director, Psychiatric Division, Denver General Hospital, Denver, Colo., discussing "Emotional Factors."

The three medical experts will then be interviewed by a team of medical and safety experts consisting of J. P. Hightower, director of transportation and safety, The Greyhound Corporation, Chicago; E. G. Cox, chief, section of safety, Bureau of Motor Carriers, Interstate Commerce Commission; and Dr. Harold Brandaleone, medical director, United Parcel Service, New York, and assistant clinical professor of medicine, New York University college of medicine.

The two-and-a-half-day program will begin with a panel on the theme of "Be Positive About Fleet Safety," led by T. J. Biddle, motor vehicle safety administrator, United States Post Office Department, Washington, D. C. Panel members will be: J. T. Jenkins, director of safety, The Mason and Dixon Lines, Inc., Kingsport, Tenn., with the topic, "Be Positive About Discipline;" A. L. Hauck, director of safety and public relations, Transportation Underwriters, Inc., Indianapolis, Ind., who will talk on the subject "Be Positive in Driver Testing;" J. H. Waspi, director of safety, Allied Van Lines, Inc., Broadview, Ill., "Be Positive in Using Incentives;" and J. L. Hughes, director of safety, Southern California Freight Lines, Los Angeles, Calif., who will talk on the subject "Be Positive in Using Safe Driver Awards."

Another half-day session will be devoted to the general topic "Accidents Can Be Stopped at the 'Hiring' Line," and will include the following speakers—D. J. Moffie, vice president for industrial relations, Hanes Hosiery Mills Co., Winston-Salem, N. C.—"Safety Starts With Your Employment Application Form;" W. C. Taylor, director, safety and personnel, Ringsby Truck Lines, Inc., Denver, Colo.—"Safety Grows With Your Interview;" J. A. DePew, director of safety and personnel, Dohrn Transfer Co., Rock Island, Ill.—"Safety Is Improved By Your Investigation;" and J. W. Lumpkin, manager, safety, Railway Express Agency, Inc., New York, N. Y.—"Safety Is Influenced By Your Decision."

"Positive Driver Supervision" is the theme of another half-day session and includes the following speakers: W. W. Carter, director, safety and personnel, Johnson Motor Lines, Inc., Charlotte, N. C.—"Orientation—The Beginning of Driver Supervision;" F. S. Lake, director of safety, Interstate Motor Freight System, Inc., Grand Rapids, Mich.—"Education—The Foundation of Driver Supervision;" S. E. Nelson, superintendent of safety, Burlington Truck Lines, Galesburg, Ill.—"Stimulation—The Framework of Driver Supervision;" and Dr. George D. Heaton, minister, Myers Park Baptist Church, Charlotte, N. C.—"Human Relations—The Key To Driver Supervision."

AT THE CONGRESS

This year the presentation ceremonies to the winner of the Marcus A. Dow Memorial Award will be part of the Fleet Victory Luncheon in the Grand Ballroom of the La Salle Hotel (Chicago).

The luncheon will again be sponsored by General Motors Corporation and will be held at noon on Thursday, October 24th.

The Transit Program

Joe V. Garvey, general manager, Harrisburg Railways Co., Harrisburg, Pa., and Congress program chairman of the Transit Section of the National Safety Council has announced completion of the Transit Section Congress program to be held in Chicago, October 22 and 23, 1957.

Keynote speaker will be Paul O. Dittmar, president of South Suburban Safeway Lines, Inc., Harvey, Ill. and president of the American Transit Association, who will speak on "It Isn't the Coach, It's the Team."

Highlights of the program will be a debate on accident analysis and a discussion of passenger safety. Against too much paper work in transit accident prevention will be J. G. Butler, director of personnel and labor relations, D. C. Transit System, who will talk on "We're Keeping Too Many Accident Records." Favoring better accident analysis techniques and opposing Butler's views will be Patrick S. Sirois, safety director for the Miami (Fla.) Transit Co., whose paper is "We Can Do More With Accident Statistics."

John A. Baker, director of training and accident prevention, Chicago Transit Authority will talk about "Selling Safety to the Passenger," while Thomas L. Ward will talk about train-

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NIXON HONORS CABBIES

Drivers picked for safety, courtesy, citizenship and service honored in ceremonies on Capitol steps in Washington, D. C.

THIRTY cab drivers, selected from among the nation's 200,000 drivers by a committee of safe driving experts and national taxicab officials for their outstanding records of safety, courtesy, citizenship and service were congratulated on the steps of the capitol building in Washington, D. C. by Vice President Nixon.

In greeting the drivers the Vice President said: "Many of us who have sat in the rear of taxicabs have marveled at the skill with which the driver pilots his car through the congested streets. I, for one, have wondered at the patience of these men, who are probably the best drivers in the world. Today some of us in the federal government are privileged in having a chance to meet 30 of the nation's top cab drivers . . . the Four Star Drivers . . . and in getting to learn something about them. I think it is an excellent thing that these men are being recognized for their outstanding safety records, their courtesy, citizenship and service to their communities.

"We hope that this recognition will impress on all of us the importance of safety on city streets and highways. Altogether, these men have covered a total of 24 million accident-free miles of driving. They have driven a total of 561 years without an accident, and their combined experience behind the wheel adds up to 653. We know that they are aware of the importance of the contribution which adequate streets and highways make to safety, for they have presented me with a scroll for the President commending him for his leadership in improving highway conditions throughout the nation. We feel that they, in turn, should be commended for the example they have set for all of us in the safe driving practices they exercise every day."

Drivers were winners of the 1957 Four Star Driver Awards program sponsored for the past four years by the Plymouth and Fargo Divisions of Chrysler Corporation.

NIXON AND TAXI DRIVERS
The Vice President greets 30 of nation's safest cabbies on Capitol steps.

Colorful PO Vehicles Have Fewest Accidents

Red-white-and-blue Post Office trucks paid out an extra dividend of safety for the approximate 29,500 vehicle Department fleet, Postmaster General Arthur E. Summerfield reported.

New reports on two representative test groups of approximately 3,500 vehicles each—one group painted in red, white and blue, the other in olive drab—discloses that the vehicles in the brighter colors had considerably fewer accidents, operating under similar conditions in 42 major American cities.

Each group was operated approximately 10 million miles—a distance regarded as providing a highly valid yardstick for a test of this kind. These are the results:

1. The olive drab fleet was involved in 849 accidents, compared with 622 for the red-white-and-blue fleet.

2. The red-white-and-blue fleet had a particularly good advantage in accidents involving other vehicles ramming

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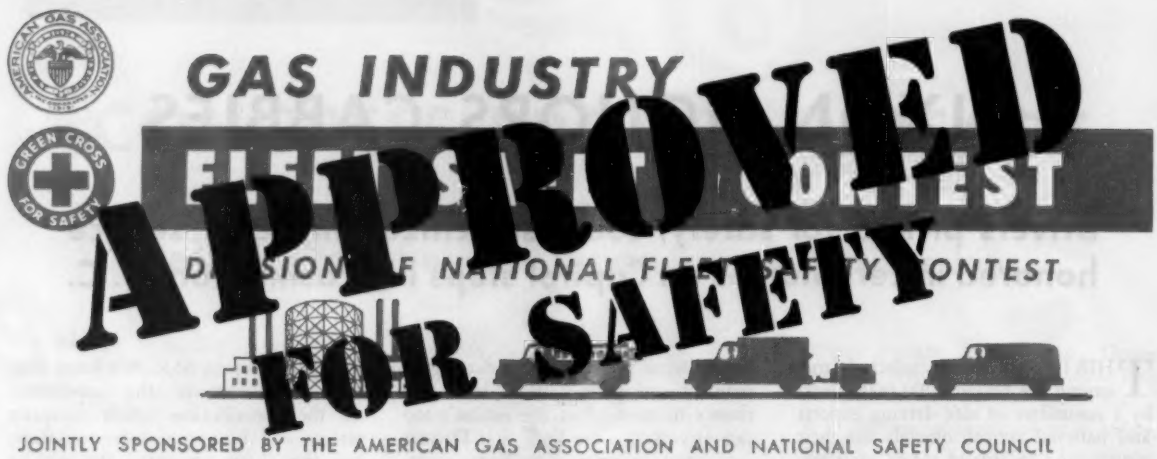


JOINTLY SPONSORED BY THE AMERICAN GAS ASSOCIATION AND NATIONAL SAFETY COUNCIL

TROUBLE-SHOOTERS, technicians, top management personnel and just plain "guys with brains" are not necessarily good drivers.

Of course, they have the capacity to drive safely, and most have the know-how as far as safe driving techniques are concerned. The big problem with these erstwhile drivers is they don't regard driving as part of their job. It's incidental to it.

That was the problem of the Gas industry three years ago and it's still a problem though not so acute. For the Statistical Subccmmittee of the American Gas Association, studying the accident records of the decade—1947 through 1956—reported that the chief cause of gas employee fatalities was motor vehicle accidents in which drivers were gas company employees.

The big switch came with the participation of member companies of the American Gas Association in the sponsored division of the National Fleet Safety Contest. During the three years of sponsorship—July 1, 1954 to July 1, 1957 — mileage of gas company vehicles climbed 33 per cent, accident frequencies dropped 15 per cent.

The American Gas Association didn't "discover" the National Safety Council. Most of the companies (more than two-thirds) that signed up for the contest had been members of the Council for years. But the sponsorship by AGA in the contest meant that industry vehicles could be identified and accident frequencies pinpointed for industry use. Other comparable sponsorships of divisions in the National Fleet Safety Contest included those by the Milk Industry Foundation, the U. S. Brewers Foundation, National Automobile Transporters Association, and

PROTECTIVE marking and warning devices used by Northern Illinois Gas Co. at repair site.

J. G. LAMBERT, safety supervisor, Northern Illinois Gas Co. tests seat belts installed on all vehicles.

American Gas Association members put seal of approval on NSC Fleet Contest participation and services in fighting fleet traffic accidents.

the International Association of Chiefs of Police.

The contest idea, born in sub-committee workshops, was immediately endorsed by AGA's top echelon. In announcing the contest to industry executives, E. H. Eacker, president of the Boston Gas Company, at that time AGA president, said, "As a gas company official, the motor vehicle accident experience in the gas industry (the nation's sixth largest industry) is a source of vital concern to you. There is now, as never before, a need for accurate comparative data as one of the tools to combat the climbing rate."

Vincent A. Howell, motor vehicle safety subcommittee chairman in 1953, further remarked, "Industry support of this accident prevention activity will be evidenced by immediate enrollment of fleets in this most worthwhile and rewarding project."

The wisdom of these leaders in predicting success by giving the National Fleet Safety Contest their "seal of approval" is borne out by the steady decline in motor vehicle accident frequency rates since the contest began.

Not satisfied with the mere numerical recording of accidents only, the Association's Accident Prevention Committee in March, 1955, began a monthly report. By concentrating on known high-frequency accident causes, they will bring about greater reductions in accident frequency.

Realizing that safety education is a potent weapon in fighting motor vehicle accidents, the American Gas Association, in cooperation with the National Safety Council, prepared a special Gas Industry edition of the booklet "The YOU Factor in Accident Causes." Released in the summer of 1956, the booklet has been a helpful supplement to educational and training materials developed and used within the industry.

Despite the fact that gas industry employees are hired for job qualifications other than their skill as drivers, their accident record is comparable, and in many instances better than some full-time professional drivers who have no duties except driving.

PUBLIC SAFETY in April, 1952, reporting driving conditions of the Panhandle Eastern Pipe Line Company in a story, "Drivers in Disguise," showed how a natural gas pipeline transmission system used the Council's Safe Driver Award program to turn technicians into skilled professional drivers. In the case of a gas transmission system it is often necessary for technicians to get to the scene of a pipe failure "on the double."

Experience showed, however, that motor vehicle accidents at such a time were extremely costly. Time losses and gas losses mounted when the services of a valuable trouble shooter were lost and a replacement had to be obtained.

Turn Page

GARAGE Foreman Bamkala, Peoples Gas, Light & Coke Co. warns brake deficiency must be fixed.

DRIVER Ray Kohnke uses Magno board to show how he was caught in "squeeze play" accident.

AGA members serve 9 of 10 gas customers in America

Consequently, company policy established safe operating rules regardless of the urgency of the situation. Basing their judgment on the fact that most motor vehicle accidents can be prevented by defensive driving, accidents were judged on the basis of whether they could have been prevented and not on the urgency of the situation or the unsafe behavior of the other driver.

More than a quarter of the drivers enrolled in the Gas Industry Division of the National Fleet Safety Contest are governed by the Council's Safe Driver Award Rules, and have been for more than a decade. Their companies, using the Council's Complete Transportation Service, cover the four corners of the United States and include Canada and Hawaii.

To companies such as Gulf States Utilities, Memphis Light, Gas & Water Division, City of Memphis, Central Illinois Light Company, Brooklyn Borough Gas Company, Houston Natural Gas Corporation, Northern Illinois Gas Company and others, the Council's Safe Driver Award is their "seal of approval." The award proves that motor vehicles, like gas appliances, are safe—if operated properly.

Although action to set up a division of the National Fleet Safety Contest came as late as 1953, it must not be inferred that this marked the start of organized motor vehicle accident prevention activity for the American Gas Association.

Motor vehicle safety has been a serious consideration of committees under the Operating Section of AGA for more than 25 years. In fact, there is still an active committee working on motor vehicle safety in the Operating Section. Its activities are related to many items of motor vehicle operation that are made a part of the operating procedures. At the present time the Automotive and Mobile Equipment Committee of the Operating Section is actively considering items such as:

1. Driver training and safe driving practices.
2. Standardization of truck body design.
3. Improved maintenance schedules.
4. Cooperation with national, state and municipal regulatory and licensing authorities.
5. Economical application of motorized equipment.
6. Study of selection of chassis, body, power accessories and construction equipment to meet specific requirements; the utilization of equipment, to assure maximum usage; the determination of factors on which to base vehicle retirement.

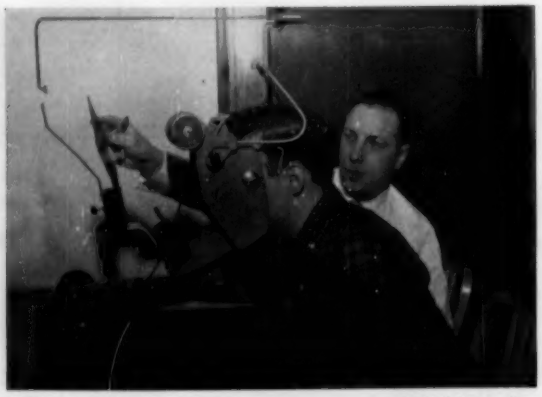
The work pertaining to employee safety is now carried out under the Accident Prevention Committee of the General Management Section. Formed in 1952, this section has accelerated and expedited projects in which top managements were vitally concerned.

Founded in 1919, the American Gas Association ranks among the ten leading National Trade Associations in the United States. It serves nearly 400 gas company members, which, in turn, serve nine out of 10 of the nation's gas utility customers.

Members handle gas and gas products from source to user. Beginning with gas producing companies to transmission systems, through distribution channels, it also includes the manufacturing and servicing of equipment. The industry employs approximately 200,000 persons, about a third of whom drive company vehicles. The vehicles range from passenger cars to highly specialized heavy equipment used in construction work. The majority are passenger cars and light duty equipment operated in highly congested metropolitan areas. The industry relatively travels on wheels to the tune of a half a billion miles a year.

Projects of the AGA Accident Prevention Committee include a series of

GEAR is checked by Wisconsin Power & Light Co. employees before taking out special equipment.



NEW DRIVER gets an eye exam on Telebinocular from J. O. Fritz, Wisconsin Power & Light Co.

Gas industry fleet winners honored annually

posters being prepared by the Committee and produced for the gas industry by the National Safety Council.

Patterned after a film produced by the Long Island Lighting Company, the Motor Vehicle Safety Subcommittee recently produced a 15 minute, 35mm sound slide film: "A Matter of Common Sense."

William J. Easton, director of Accident Prevention, Cincinnati Gas & Electric Company, present chairman of the Motor Vehicle Safety Subcommittee of AGA, announced at the March 1957 accident prevention meeting in Edgewater Park, Miss., the production of a series of nine motor vehicle safety flipcharts being prepared by the Educational Subcommittee of the Accident Prevention Committee—"Backing Can Be Safe."

The Annual Accident Prevention Conference held by AGA furnishes the setting to honor winners of the various groups of the Gas Industry Division of the National Fleet Safety Contest. Last year, at Denver, Colorado, during the eighth annual conference co-sponsored by AGA and the Rocky Mountain Gas Association, fifteen winners of the 1955-1956 Contest were announced. They came from ten different states, many from large, heavily-congested metropolitan areas.

The conference in Denver presented three previous contest winners in a panel entitled "Our Driver Control Program." Excerpts from these talks revealed the intense interest in automotive safety generated at the company level.

Charles Cummings, safety director of the Hope Natural Gas Company of Clarksburg, W. Va., reported: "In selecting our full-time drivers, the responsible supervisor usually chooses a man with considerable previous experience either within or outside of the company and then, only after careful inquiries, interviews and driving tests, is he hired. In some cases, he may be sent out with other drivers in order to learn the company's policies in driving.

"Our company uses a Keystone Telebinocular to test the eyes of our drivers periodically. We find a number of drivers who need glasses and others who need new glasses. When their vision has been corrected we then permit them to drive.

"Each month a short description of all the motor vehicle accidents are sent to a vice president. On this sheet the company drivers who are responsible for the accident are pointed out and the vice president writes a personal letter to the driver. I feel that this activity is paying off."

R. H. Spikes, safety director of the Pioneer Natural Gas Company in Amarillo, Texas, member of the National Safety Council since 1932, indicated that frequent "on the job" safety meetings had replaced formal quarterly meetings and were considered successful. Job safety training during probationary periods before an employee was allowed to drive company vehicles has helped in the behind-the-wheel instruction. His company won first place in the Gas Utility Group, large sized companies.

J. O. Fritz, safety assistant for the Wisconsin Power & Light Company in Madison, Wisconsin, member of the National Safety Council since 1933, spoke as the winner of the Gas Utility Group, medium-sized companies.

"The Wisconsin Power & Light Company believes that safety rules are useless unless enforced. This responsibility is also a district function. Violation of a safety rule or state law, even if no accident occurred, could be cause for disciplinary action. This discipline is determined and applied by the managers. A statement of the policy covering disciplinary action, signed by the president, is in every employee's rule book."

". . . these safety rules have been revised to keep abreast of changing

GAS
GUS
"Hey there! Avoid the squeeze play. Look *before* backing."
LET'S BY-PASS THAT ACCIDENT
"Atta boy! A defensive driver doesn't rely on the other guy."

A few of the posters developed by the American Gas Association and the Council.

Many gas industry fleets use complete NSC services

WINNERS' ARM BANDS
Hope Natural Gas Co. had fleet contest winners wearing arm bands like this.

conditions and improvements in equipment and procedures, and incorporate the best thinking and most successful experiences of the utility industry. These rules have the whole-hearted approval and support of management . . ." signed Carl J. Forsberg, president.

Such automotive accident prevention activity is not, of course, limited to the winners. J. G. Lambert, safety director for the Northern Illinois Gas Company in Wheaton, said they have a most ambitious driver program. The Northern Illinois Gas Company as such has been in business just a few years, having been separated from the public service company combination in 1952.

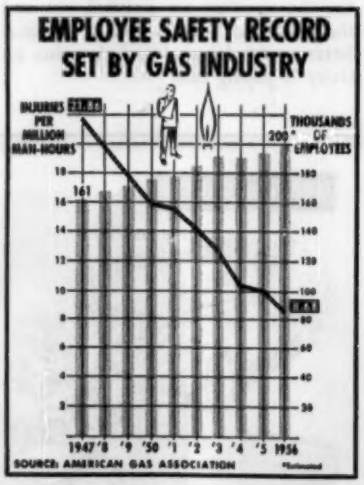
In addition to the monthly Driver Letter, posters and *Safe Driver* magazine furnished as part of the National Safety Council's Complete Motor Transportation Service, Mr. Lambert's staff prepares a monthly bulletin providing supervisors with ammunition for weekly safety conferences. Each week's lesson provides a theme, objective, lesson unit and helpful hints to the conference leader. For example, the June 10 lesson subject, "Defensive Driving" and the June 17 lesson unit "Death Takes No Holiday" cover both on and off-the-job vehicular accident prevention material. Cleverly illustrated, the bulletins provide comment sheets for each lesson. The sheets provide for recommendations for changes in tool designs, additional information needed on the subject, discussion highlights, and typical hazards reported on the particular subject brought out by group discussion.

In introducing the Council's Safe Driver Award Plan, the Northern Illinois Gas Company had this to say to its drivers.

"By this time each of you must know that the Company is now participating in the Safe Driver Award Program sponsored by the National Safety Council. This is *the highest award for drivers* of fleet vehicles and one which each of us should be justly proud if we are fortunate enough to receive one." The Safe Driver Award is the trademark of drivers who have proved their skill in avoiding *preventable accidents.*

At the fleet maintenance shop of the Peoples Gas Light & Coke Company, Chicago, Al Finch, NSC Fleet Engineer, saw how vehicles were put through a safety lane check for brakes, wheel alignment, lights, etc. E. S. Beaumont, director of safety for Peoples Gas, guided a tour of the facilities, and showed the repair equipment housed in the garage. Mr. Finch also attended a review meeting in which the driver involved in an accident appeared before a top group of supervisory personnel to explain his mishap.

Drivers enrolled in fleets participating in the Gas Industry Division of the National Safety Council are making a substantial contribution to the motor manners of their home communities. By their example they are influencing the habits of other drivers. They are also putting their own seal of approval on the techniques of professional safe driving performance demanded of contest entrants. END



WHILE employment in the gas utility and pipeline industry has increased more than 24 percent since 1947, the industry's safety record has been improved 60 percent. The accident frequency rate was reduced in 1956 for the ninth straight year and achieved an all-time record of only 8.68 disabling injuries per million man-hours worked.

Colorful PO Vehicles

From Page 49

into the rear-end of the postal vehicle. There were 50 such accidents for the olive drab, compared with 24 for the red, white and blue fleets.

Consequently, the following conclusions may be drawn from the latest survey findings, the Post Office Department safety engineers reported:

1. Red-white-and-blue vehicles—because of their greater visibility—are helping to promote safety in thousands of American communities.

(The Department recently won, for the third consecutive year, the National Safety Council's Citation for Meritorious Service to Safety, and the Department's city accident rate has been cut to an all-time record low of less than 3 for each 100,000 miles driven.)

2. There has been a particularly good reduction in rear-end type of collisions because other drivers on crowded city streets can see the postal vehicles better.

The top section of postal vehicles is in gleaming white, and the middle strip is of reflectorized tape, which makes them more visible, particularly at night, the study indicates.

Postal vehicles are painted in the new colors only as they need repainting.

The Post Office Department fleet of approximately 29,500 is the largest individual fleet in the United States.

Back the Attack on TRAFFIC ACCIDENTS

THE FAMILY CAR

I'm steel and glass and chrome
And countless other things.
I'm a hundred and twenty horses.
Equipped with restless wings.

I'm the family's willing servant,
I'm indeed a way of life.
I'm every young man's fancy
Long before he takes a wife.

I'm weddings, birth, and friendships,
I'm picnics by the sea.
I'm junior proms and county fairs,
I'm wherever you want to be.

I'm the children's magic carpet
To church, to school, and store.
I'm a smile on the face of the weary.
These I am—and something more.

I'm heedless power and futile pride
I'm fury all robbed of sense.
I'm the teacher of costly lessons,
I'm the tool of recompense.

I'm speed that has no reason
I'm chance that cannot win
I'm the voice of a dearly beloved
Lost to the might have been.

I'm the wreck that couldn't happen
I'm the sign that wasn't read
I'm the bitter day of reckoning
I'm a stand-in for the dead.

I'm a thing of man-made beauty
Attuned to a moment's breath
I'm a faithful slave or an ogre
I am life—or sudden death.

—By Frances M. Cagney
Courtesy The Merck Review

NSC Gets Grant of $175,000

From Page 14

250 local safety organizations in the nation. These groups encourage more effective official programs, including police supervision, traffic engineering, driver licensing, improved and uniform legislation, and public education.

Each of the donor groups is active in conducting safety programs of its own and in supporting and encouraging the safety efforts of other groups. The Automobile Manufacturers Association is composed of the nation's leading manufacturers of motor vehicles. The Association of Casualty and Surety Companies represents 140 capital stock companies writing casualty insurance and surety coverages, and the National Association of Independent Insurers represents 291 independent companies writing casualty insurance and surety coverages.

Parents ~~WANT~~ demand
a WELL EQUIPPED
Safety Patrol
SAFETY
FRANKLIN
PATROL
That's where we can help . . . Graubard's Equipment is nationally known as the school safety patrol equipment "That Promotes Safety." It does this by fulfilling both of the conditions essential to a really effective Safety Patrol. First, it gives each patrol member a definite sense of responsibility and a pride in doing his job well. Second, being "Standard Equipment" it is recognized by school children and motorists alike, assuring their respect and cooperation.
Take the time to check your safety patrol today! Look over the many "standard" Safety Patrol Equipment items listed below and be sure your patrol members are properly uniformed and ready to perform the vital task of protecting your children, in all kinds of weather! . . .
Belts
Caps, Helmets
Badges
Arm Brassards
Emblems
Raincoats
Capes
Caution Flags
Merit Awards
Boots & Overshoes
Corporal
Digbys
Trafficones
School Warning Signs
Traffic Control Signs
GRAUBARD'S
Note New Address
236 High Street Newark 2, N. J.
"America's Largest Safety Patrol Outfitters"

Circle Item 5—Reader Service Card

THE SAFETY LIBRARY

By Ruth Parks, Librarian, NSC

Books, pamphlets, and articles of interest to safety men.

Accidents

All Accidental Deaths and Motor-Vehicle Deaths, 1910-1956. Public Safety Memo. 58, 2p., 1957 revision. National Safety Council, 425 N. Michigan Ave., Chicago 11, Ill.

Better Try Again, Mr. Buck. T. J. Biddle. *Commercial Car Journal*, p.88-90+, June, 1957.

(Comments on Mr. Buck's new way to rate fleet accidents and a defense of the present use of frequency rates.)

Off-the-Roadway Accidents 1955-1956. 12p., 1957. Safety Division, Motor Vehicle Department, Madison, Wis.

(Statistical study of automobile accidents not involved in collision with another car.)

Standard City Traffic Accident Reporting System. Public Safety Memo. 69, 20p. and Forms, 1957 edition. 20¢. National Safety Council, 425 N. Michigan Ave., Chicago 11, Ill. Stock No. 329.01-69.

Belts

Some Aspects of Passenger Restraining Devices and Safety Research Problems. Andrew J. White. 20p., 1957. Motor Vehicle Research, Lee, N. H.

(Safety Forum, Massachusetts Institute of Technology, April 11, 1957.)

Brakes

Stopping Ability of Motor Vehicles Selected from the General Traffic. F. W. Petring. *Public Roads*, p.177-195, June, 1957.

(Presents results of tests on 1,200 vehicles comparing past and present levels of brake performance.)

Chemical Tests

Chemical Tests and the Law, a 257-page treatise by Robert L. Donigan, has been published by the Traffic Institute, Northwestern University, Evanston, Illinois.

The author is counsel for the Traffic Institute and is recognized as an authority on the subject of the book—legal aspects of and constitutional issues involved in chemical tests to determine alcoholic influence.

The new book contains chapters on the Need For Chemical Tests to Determine Alcoholic Influence, Validity of Chemical Tests to Establish Amount of Blood Alcohol Concentration, Interpretation of Results of Chemical Tests, Does Person Have Right to Have Chemical Test Made? Reliability of Test Method to Determine Blood Alcohol Concentration, Techniques in Methods of Conducting Chemical Tests, Qualifications of Persons Preparing and Presenting Chemical Test Evidence, The Physician-Patient Privilege, Constitutional Issues, and "Implied Consent" laws.

In addition, sample list of questions and answers for presenting testimony of expert witness, 203 Court Decisions Concerning Chemical Tests to Determine Aloholic Influence (from 35 states and the federal jurisdiction), and Provisions of Chemical Test Legislation in 26 states.

Chemical Tests and the Law is clothbound, sells for $7.25 from the Traffic Institute, Northwestern University, 1704 Judson Avenue, Evanston, Ill.

Church Activities

Highway Safety. *Christian Life*, June, 1957, p.39-41.

(What the Christian can do to halt accidents.)

Drivers and Driving

Driver Characteristics. Bulletin 152, 37p., 1957 edition. 80¢. Highway Research Board, 2101 Constitution Ave., Washington, D. C.

(Personal characteristics of chronic violators and accident repeaters. Leon Brody, p.1-2. Dynamic Visual Fields. Barry G. King and Peter J. Surto. p.3-14.

Effect of Rest Pauses and Refreshment on Driving Efficiency. A. R. Lauer and Virtus W. Suhr. p.15-22. Analysis of "Near Accidents" Reports. p.23-37.)

Reducing Traffic Accidents by Use of Group Discussion-Decision: An "a priore" Evaluation. Abbott L. Ferriss and Others. Technical Memorandum, OSSP-TM-57-2, 109p., 1957. Office for Social Science Programs, Air Force Personnel & Training Center, Randolph Air Force Base, Texas.

(Program to control off-duty automobile accidents in private car by influencing driver attitudes at Air Force Base.)

Headlights

A Method of Evaluating Seeing Distances on a Curved Roard and Its Application to Headlight Beams in Current Use. V. J. Jehu. Reprint from Trans. Illum. Eng. Soc. (London), Vol. 22, No. 3, 1957, p.69-93. 15p., 1957. Road Research Laboratory, Harmondsworth, Middlesex, England.

Highways

The Federal Government's Stake in Adequate Highways in Peacetime and War. 10p., 1957. National Highway Users Conference, 966 National Press Bldg., Washington, D. C.

A Procedure for Ranking Roads in Terms of Their Importance. John E. Stoner. *Highway Research Abstracts*, p.24-30, June, 1957.

A Symposium on Highway Shoulders. Bulletin 151, 27p., 1957. 75c. Highway Research Board, 2101 Constitution Ave., Washington 25, D. C.

(Various papers covering benefits, cost, construction, design and safety aspects.)

Urban Arterial Planning. Bulletin 153, 43p., 1957. 90¢. Highway Research Board, 2101 Constitution Ave., Washington, D. C.

(Direction of Analysis of Vehicle Travel Desired. Arthur T. Row. p.1-14.

Directional Contour Maps of Travel Desired. L. M. Broff and Others. p.15-27.

Comprehensive Arterial Highway Plan for the Cleveland Metropolitan Area. Thomas J. Fratar. p.28-43.)

Lighting

Compare and Evaluate Light Sources on Roadway Lighting Proving Ground. *Electric Light and Power-Industry Report,* p.36+, July 1, 1957.

(General Electric establishes a roadway demonstrating types of lighting for studies and research on how well the drivers see under various roadway systems.)

Highway Lighting. *Street and Highway Lighting,* p.6-7+, 1957.

(Committee on Highway Illumination of the American Road Builder's Association recommendation for factors in highway lighting as controlled with that for local streets within municipalities.)

Relighting Four Hundred Miles of Streets in Nashville. E. E. Parks. *Street and Highway Lighting,* p.8-9+, June, 1957.

Report of the Street Lighting Subcommittee to Greater Grand Rapids Civic Study Committee. *Streets and Highway Lighting,* p.17+, June, 1957.

(Getting street lighting for your city. Actual report of a proposed relighting plan.)

Research

Automotive Crash Injjury Research. Annual Report, April, 1956 to March, 1957, 31p. Department of Public Health and Preventive Medicine, 1300 York Ave., New York 21, N. Y.

(Section III—Research findings reports parts of body injured, major causes producing injury: Evaluation of 1956 cars, belts and steering wheels.)

Speed

Speed Studies (Semi-Annual). *Traffic Operation Speed Studies,* 33p., 1957. Arizona Highway Department, Division of Traffic Engineering, Phoenix, Ariz.

Traffic Speed and Volume Measurement. Bulletin 156, 44p., 1957. 90c. Highway Research Board, 2101 Constitution Ave., Washington, D. C.

(Measurement of Urban Traffic Congestion. Claude A. Rothrock and Louis E. Keefer. p.1-13. Moving Vehicle Method of Estimating Traffic Volumes and Speed. William J. Mortimer. p.14-26.

Speed and Travel Time Measurement in Urban Areas. William P. Walker. p.27-44.)

Tank Trucks

Tank Vehicles for Flammable Liquids—Recommended Regulatory Standard of the NBFU as Recommended by the National Fire Protection Association. 15p., 1957 revision. National Board of Fire Underwriters, 85 John St., New York 38, N. Y.

Traffic

The Price of Progress. 9p., 1957. Traffic Institute, Northwestern University, 1704 Judson Ave., Evanston, Ill.

(A program and plan of action for reducing traffic accidents in cities, counties, states and some outstanding results.)

Vision.

Faulty Vision — Sudden Death. *Best's Insurance News—Fire and Casualty,* p.81-82, June, 1957.

(Inadequacy of vision standards for drivers and driver licensing.)

Addresses of Magazines Mentioned

Best's Insurance News — Fire and Casualty, Alfred M. Best Co., 75 Fulton St., New York 38, N. Y.

Christian Life, 33 S. Wacker Drive, Chicago 6, Ill.

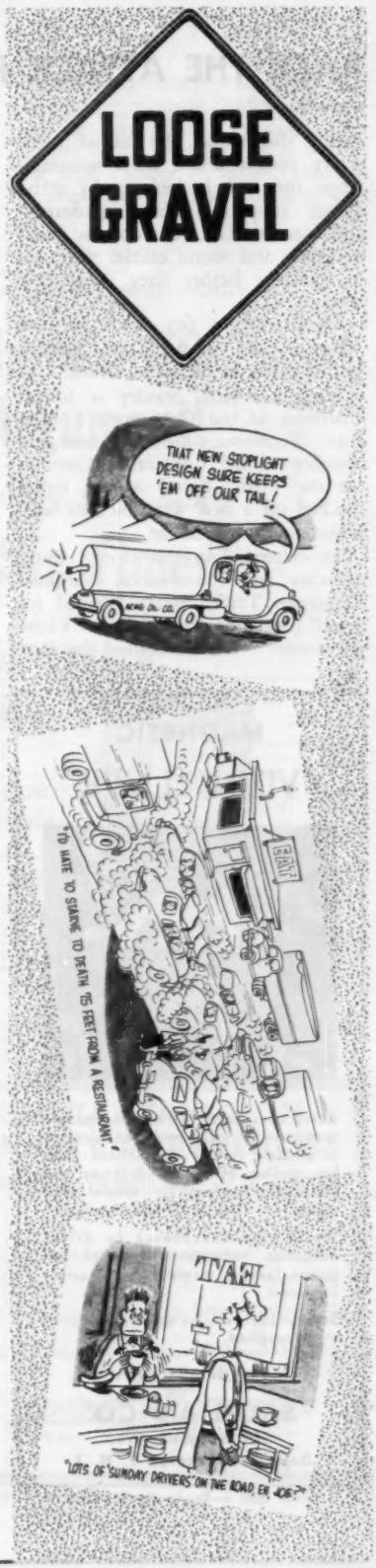
Commercial Car Journal, Chilton Co., Chestnut & 56th Sts., Philadelphia, Pa.

Electric Light and Power-Industry Report, Haywood Publishing Co., 6 N. Michigan Ave., Chicago 2, Ill.

Highway Research Abstracts, Highway Research Board, 2101 Constitution Ave., Washington 25, D. C.

Public Roads, U. S. Bureau of Public Roads, Washington 25, D. C.

Street and Highway Lighting, Street and Highway Lighting Bureau, 1400 Terminal Tower, Cleveland 13, Ohio.


LOOSE GRAVEL
THAT NEW STOPLIGHT DESIGN SURE KEEPS 'EM OFF OUR TAIL!
"I'D HATE TO SWING TO DEATH 15 FEET FROM A RESTAURANT."
TAH!
"LOTS OF 'SUNDAY DRIVERS' ON THE ROAD, EH, JOE?"

BACK THE ATTACK ROUNDUP

From Page 25

clearly shows that the official traffic safety programs are most successful when they are backed up by active citizen support. Public indifference and even resistance has doomed many necessary and sound official programs to failure before they were even started."

In **Bristol, a city that's in both Virginia and Tennessee,** officials joined hands to *Back the Attack.*

Virginia's Gov. Stanley is former chairman of the Governor's Conference. Tennessee's Gov. Clement is a member of the Conference Committee on Traffic Safety whose report touched off a new wave of state-local action across the nation.

In commending the Bristol traffic agencies and the Bristol, Virginia-Tennessee Traffic Safety Council for a well conceived program, Gov. Clement wrote: "We are behind the *Back the Attack* program 100 per cent. As you probably are aware, I am a member of the National Governor's Conference Traffic Safety Committee. We believe that *Back the Attack* will materially aid the program as outlined by our committee."

The Bristol campaign, calling for strong official action on both sides of the border, was marshaled when records showed an alarming rise in the crash toll. Facts were analyzed and a program of official action through 1957 was laid out, with appropriate public support effort outlined.

From ***Memphis, Tenn.,*** G. C. Harris, regional director for the Post Office Department, reports progress on the *Back the Attack* program. Here, in their own words, are excerpts from some of the many reports received from postmasters in the area:

"Have discussed the program with state highway patrolman and school officials, local law enforcement officers and other interested parties and will support programs being developed."

"Have contacted Lions Club, mayor, local PTA, and will cooperate in program."

"I have volunteered my services regarding this program to the mayor of our city."

"At my suggestion the local community club has adopted safety as one of our 1957 projects."

"Our program for the relocation of all rural mail boxes on the right side of the road in the direction of the rural carrier is progressing."

North Carolina Motor Carriers Association official publication, *Tarheel Wheels,* is carrying its traffic safety hints under a full-color *Back the Attack* banner.

Illinois Secretary of State Charles F. Carpentier told the opening session of the Illinois Association of County Officials that driver training courses in state high schools are a "must." Mr. Carpentier stated that if we fail now to give these youngsters the proper "training and understanding necessary to handle this lethal weapon—the automobile—we are in the same position as a parent who hands a loaded gun to a child."

At ***Lansing, Mich.,*** on May 9, the first Ingham County Citizen's Traffic Safety Conference was held. In announcing the conference, Harold F. Lillie, director, Safety Council of Greater Lansing, said its purpose was to: "Give public officials responsible for traffic control an opportunity to inform citizens of the county about the problems facing their departments."

Edward L. Warner, Jr., president of the Lansing Council, was moderator of the conference panel. Members were the sheriff, county superintendent of schools, superintendent of the county road commission, prosecuting attorney, county judge, and a justice of the peace.

Mr. Lillie also expressed the hope that the meeting would result in the formation of citizens' committees in the county where none exist at present.

In ***Sioux Falls, S. D.,*** and ***Sioux City, Iowa,*** delivery men of the Continental Baking Co. left at all their retail outlets displays and supplies of request cards offering *Back the Attack* bumper strips to everyone who sends in a card. Reports from Sioux City are that thousands of cards have been sent in. Continental Baking people in Sioux Falls said the format of the project was sent in to the home office. It may be repeated in other areas soon. The bakery worked co-operatively with safety councils in their area.

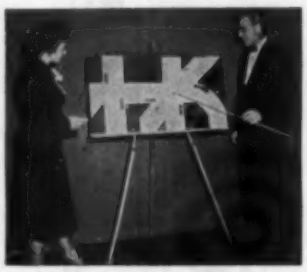
Arizona asked the President's Committee to make a field study of its traffic safety problems. The study was made during the period of March 13-22, 1957. Result: Priority safety need in Arizona is for a strong, well-organized and well-managed citizens' traffic safety organization. In other words, the citizens of Arizona must *Back the Attack* if they are to move from their unenviable position at the top of the death rate column.

The Ajo Community Safety Council Safety Check chairman reports, "Our Council will again sponsor the Community Vehicle Safety Check . . . this year it is part of *Back the Attack.*"

California's Santa Cruz County is using the mails to build public support for *Back the Attack.* It costs not one cent extra for postage, though, because they use the *Back the Attack* postmark ad plate. Every letter from the county purchasing department carries not only the *Back the Attack* burst and message, but the line "in Santa Cruz County."

MAGNETIC

"VIZ-U-LIZER"



Board consists of (3) interchangeable sections—14" x 22" each—Enables you to simulate various intersections. Back has replica of 4 lane highway and blackboard surface for special situations.

World-wide acceptance by driver education instructors, insurance adjusters, lawyers, magistrates and safety engineers.

Scale model vehicles and traffic equipment supplied.

For details write

SALES AID CO.
149 Grayson Ave.
Dept. P — Trenton 9, N. J.

Circle Item 6—Reader Service Card

Among Washington's dozen bills enacted into law during the 1957 legislative session is House Bill 305 which establishes the Highway Safety Fund for the exclusive use of the State Patrol. House Bill 308 raises the basic license fee for vehicle licenses from $5 to $6.50. ($3.50 of the $6.50 collected is earmarked for the State Patrol.) The Patrol budget for the next two years is 12 million dollars. This will permit the addition of 159 patrol officers and more license examiners and weighmasters.

And to point up the way the Armed Services have taken to the *Back the Attack* campaign, witness the recruiting program of the National Guard. With a traffic safety theme, some 400,000 posters have been distributed throughout America.

One of the two posters being distributed through the adjutants general of all states and territories says: "Don't drive your car like a tank . . . But, if you want to drive a tank, JOIN THE NATIONAL GUARD!" The other, reads: "Don't 'fly' on the highways. Do your flying with the Air National Guard!"

The two-color posters (11 x 14") are designed for use in all public places and are being distributed by more than 5,000 National Guard units in cooperation with national and local safety and law enforcement organizations.

They can be had on application to the National Guard locally, or via the bureau, The Pentagon, Washington, D. C.

Pick Top Communities in Vehicle Check Program

Indianapolis, Ind., and Trumbull County, Ohio, have been named grand award winners for conducting the most outstanding city and county community vehicle safety-check programs in the nation.

National awards of excellence for top city and county programs conducted during May and June, according to population groups, went to: Great Bend, Kan.; Fargo, N. D.; Fresno, Calif.; Wright County, Ia.; Huntington County, Ind., and Orange County, Fla.

"Special Judges Awards" for outstanding performance went to Anderson, Indiana, and Cheyenne, Wyoming.

An additional 49 cities and six counties were cited for state awards of excellence within participating states, according to population groups.

Final reports from nearly 700 of more than 1,000 planned community safety-check programs had been received at the time of the judging of award entries. Awards are based on effective community promotional and cooperative efforts in checking the safe driving condition of vehicles. The quality of the safety-checks as well as the total number of vehicles checked in relation to an area's potential were considered by the board of judges.

Circle Item 7—Reader Service Card

There's NO Argument!

Traffic cases are "air-tight" with

New Traffic Timer

LET US SHOW YOU HOW IT

PAYS FOR ITSELF

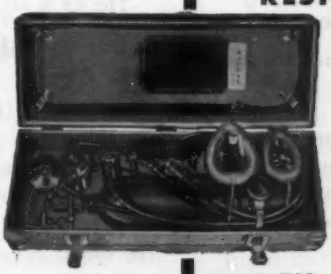
- New! Road Tube Distances
- Electric Eye or Tape Control Available

MUNI-QUIP CORP.
868 W. CENTER — DECATUR, ILLINOIS
Send Traffic Timer Folder No. 42

Name_____
Title_____
Street_____
City_____ State_____

Clip And Mail

FAST IMMEDIATE SERVICE IN RESPIRATORY EMERGENCIES



STEPHENSON "MINUTEMAN" RESUSCITATOR
(weighs only 30 pounds)

Especially designed in weight and size, for quick, easy application in cases of fume suffocation, gas poisoning, heart attacks, etc.

Write for FREE demonstration or pamphlet S-408.

STEPHENSON CORPORATION
RED BANK NEW JERSEY

INHALATOR
ASPIRATOR
RESUSCITATOR

Circle Item 8—Reader Service Card

NEW... SAFETY EQUIPMENT

Publication of product announcements in this section should not be construed as endorsement or approval by the National Safety Council.

Free Flowing Bead Dispenser

A positive action, precision built, free flowing bead dispenser is claimed by the manufacturer as an economical answer to the problem of reflective glass bead application.

Suitable for attachment to any traffic line paint machine, the unit dispenses beads in any quantity at any given speed and is available in four, five and six inch widths. Completely automatic, it may also be manually operated and works equally well, the company reports, with standard type A beads, Free Flow beads, or moisture-resistant type C.

Of rugged cast aluminum construction, the simplified mechanism affords trouble-free operation.

Flex-O-Lite Manufacturing Corp., 8301 Flex-O-Lite Drive, P. O. Box 3066 (Affton Branch) St. Louis 23, Mo. (Item 41)

Reflectorized Arm Bands

"Glo-patch" armbands are made of highly reflectorized Scotchlite fabric and show up in the light of oncoming vehicles. The plastic bands are slipped over the arm. They are especially valuable for utility, railroad and air line employees, construction or oil field workers, plant guards, pedestrians and for any personnel who work outdoors at night. They are also recommended for miners and tunnel maintenance men.

The patches are available in various colors and sizes.

The Olympic Glove Co., Inc., 95 Madison Ave., New York 16, N. Y. (Item 42)

Permanent Marking Compound

A permanent marking compound — Perma-Line — for streets, parking lots, airfields and industrial safety zoning, is a replacement for paint and other temporary marking methods.

The manufacturer claims that the thermo-compound will increase auto, pedestrian and industrial safety in addition to decreasing municipal and business maintenance costs.

The material is applied in a quick, one-man operation and dries in ten minutes.

The product is guaranteed by the manufacturer to last at least fives times as long as paint.

The durability results from the fact that after being applied in a one-eighth inch thickness at 400° F. with a gas-heated applicator, the material fuses with the pavement as a hard and fast part of the surface. Its radiance is derived from the various resins in the compound which cause it to bleach when exposed to sunlight, insuring against fading or discoloration. Perma-Line is available in yellow and white.

Veon Chemical Corp., 22-09 Bridge Plaza North, Long Island City, N. Y. (Item 43)

Oxygen Inhalator Kit

A portable oxygen inhalator kit with a control gauge which regulates the flow of oxygen making it impossible to inhale an overdose is designed for truck drivers, fleet owners and highway safety officials.

According to the manufacturer, the inhalator is not intended as a substitute for sleep but is to replace such artificial stay-awake stimulants as alcohol, caffein and other drugs. The kit can also be used by factory workers, policemen and firemen.

Each kit has two removable oxygen cartridges, one ready for use and a spare cylinder. A gauge attached to each unit indicates at all times how much oxygen remains in the cartridge.

The kit is 16 x 4 inches and weighs 6¼ pounds.

Oxy-Gear, Inc., 30 N. LaSalle St., Chicago 2, Ill. (Item 44)

Speed Timer

The M.P.H. speed timer qualifies as a safety measure because it is said to reduce the need for pursuit of speeding vehicles. The speeder can see his registered speed and understands the simple and accurate means of checking the speed.

Only one man is necessary for operation in most situations and the precision electric stop clock design assures accuracy.

For More Information—Circle Item Number on the Reader Service Postcard

The portable (it weighs 37 lbs.) has a large easy-to-read dial face that is calibrated in miles per hour. The dial is divided into one mile divisions in the 16 to 60 mile range and two mile divisions in the 60 to 100 miles per hour range. The housing of the unit is made of heavy gauge aluminum.

C. H. Stoelting Co., 424 N. Homan Ave., Chicago 24, Ill. (Item 45)

Portable Flashing Signal

A portable, flashing signal designed to slow down or stop traffic at school intersections, factory parking entrances, or any problem areas can be rolled easily to any desired location and put into operation with a turn of the key-lock switch. It can be supplied with either a red or amber flasher and a "stop" or "slow" shield.

The unit operates off a 6-volt storage battery continuously for approximately 130 hours. It is visible even when viewed against the sun.

The flasher's timing mechanism, battery and other regulating equipment are contained in a tamper-proof, heavy-gauge metal box. The 6-inch wheels will allow even young children to easily move the flasher into place. The wheels are equipped with semi-pneumatic tires and heavy-duty ball bearings.

The red or amber lens, visible from two directions, conforms to National Emergency Vehicle specifications.

Save-A-Life Signal Sales Co., 924 35th St., Des Moines, Iowa. (Item 46)

Metal Warning Signs

Immediate delivery can be made on this complete line of stock metal warning signs.

Containing more than 300 stock titles, tht Dav-Son line covers practically every sign requirement of factories, office buildings, municipal departments, etc. The signs are silk-screened in weatherproof enamel paints in either two or three colors.

Traffic signs, clearly lettered in vivid yellow and black are 14x18 inches, and cover all basic traffic instructions such as "No Left Turn," "RR Crossing," "Playground," "No Parking," etc.

In addition to the stock signs, the company can produce metal signs to order for any special purpose.

A. C. Davenport & Son, Inc., 311 N. Des Plaines St., Chicago 6, Ill. (Item 47)

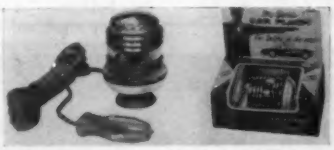
Street Marker

SL46 Skipliner is a device for intermittent marking of streets and roads. Traffic Engineers and Safety Maintenance men will welcome the marker for retracing existing intermittent lines.

The mechanism involves an intricate epicyclic gear train mechanism with a mechanical interlocking device. By manipulation of the conveniently designed controls it is possible for the operator to stop the cycle, return the cycle to a zero or starting position, advance or retard the cycle indefinitely for exact registration over old lines. It is also possible to go from a skip line to a solid line for curves, etc.

Specifically, the unit was designed for truck towed stripers of all makes but engineers report that it can be adapted for the larger type portable, self-propelled stripers.

Wald Industries, Inc., Huntingdon, Pa., (Item 48)



Car Safety Light

A plug-in type flashing light called the Big Beam Car Flash mounts securely on any flat, smooth surface of an auto or other convenient object with a suction cup and plugs into a cigarette lighter with a ten-foot cord. It flashes 72 times per minute and will operate overnight without running down the battery.

The visibility distance is determined by the mounting location and lens color used. The lens is available in red, green, amber, blue or clear, and is made of molded plastic. They may be used with either six or twelve volt systems and are made of rust-resistant steel.

U-C-Lite Mfg. Co., 1050 W. Hubbard St., Chicago 22, Ill. (Item 49)

Emergency Signal Flags

Hy-Syns Signal Flags with various designs can be used by motorists to signal distress situations. A passing motorist can observe the color of the flag flying and take action to bring help.

There are two positions for the flag; completely open means that help is needed; a triangular fold means that help is on the way. This will indicate to passing motorists the status of the emergency.

Professional Products Co., Box 22, Toledo 12, Ohio. (Item 50)

SAFETY PRODUCT LITERATURE

Patrol Car Emergency Breathing Kit

For emergency use in those first extremely critical minutes whenever breathing needs to be restored, folder describes how the "Emergikit" resuscitator which is completely self-contained and operated by its own oxygen power, provides automatic resuscitation until arrival of official rescue or ambulance services. E & J Manufacturing Co., 100 E. Graham Place. Burbank, Calif.

For more details circle No. 81
on enclosed return postal card.

G.E. Radio Bulletins

General Electric's Communication Products Department, Syracuse, N. Y., has published two bulletins on two-way radio selective-calling. ECR-448 describes "Individual Call," which enables an operator to turn down radio volume until he receives a light or buzzer signal indicating an incoming call. ECR-439 explains "Group Call," showing how a radio-equipped fleet may be sub-divided into as many as ten different groups according to job functions, by types of vehicles, or by locations served. With "Group Call" it is possible for the user to communicate instantly with a specific sub-divided group without affecting other units in the fleet.

For more details circle No. 82
on enclosed return postal card.

To Prevent Rock Salt From Caking

"Sterling Storite," International Salts new anti-caking agent for the storage of ice removal rock salt, is treated in a short booklet just published by International Salt Co., Scranton, Pa. Description of the product, how it works, how it should be used, how to minimize rain losses, and how to order, are covered under separate headings.

For more details circle No. 83
on enclosed return postal card.

Complete Line of Power Units

Detroit Diesel Engine Division, General Motors Corp., Detroit, Mich., has issued a 19-page illustrated catalog outlining its complete line of power units for all type of industrial applications. Specifications are given on 31 engine models ranging from 44 to 761 brake horse power, including new 6-cyl. Turbopower engine.

For more details circle No. 84
on enclosed return postal card.

Barricade and Safety Lights

Improvement in its line of battery-operated Flasher safety lights, designed for low-cost, dependable hazard warning protections, are described in this bulletin available from R. D. Fageal Co., Kent, Ohio. Known as the HD series, the lights are powered by an 8-cell battery, reputed to afford up to 90 days of continuous operation without battery replacement or servicing.

For more details circle No. 85
on enclosed return postal card.

Truck Tire Tool

Featured in this bulletin is a new invention for de-mounting truck tires quickly and eliminating the use of pry bars and sledge hammers has been announced by Harval Co., 5125 Coffmon-Pico Road, Pico, Calif. This tool—also eliminates the danger of lock rings from "exploding" when the tire is being inflated. According to manufacturer it guarantees 100 per cent controlled safety. It is portable and can be carried on repair trucks for field service.

For more details circle No. 86
on enclosed return postal card.

Diesel Trouble Shooting

If you are having trouble with a specific piece of equipment, what do you do? A bulletin just released by the service division of Cummins Engine Co., Inc., Columbus, Ind., recommends that, first, you "think before you act." Then ask yourself these questions: (1) What were the warning signs preceding the trouble? (2) What previous repair and maintenance work has been done? (3) Has similar trouble occurred before? The bulletin is entitled "Principles of Trouble Shooting for Cummins Diesels." It is designed to unfold so that it can be used as a wall chart on which complaints are listed and probable causes noted. "Trouble shooting," according to the bulletin, "is nothing more nor less than an organized method of procedure for the investigation and correction of the difficulty."

For more details circle No. 87
on enclosed return postal card.

Radar Vehicle Detector

The Electro-Matic Radar Vehicle Detector presents an entirely new concept in detection for traffic-actuated control, according to Bulletin D-154 available from Automatic Signal Division, Eastern Industries, Inc., Norwalk, Conn. Situated above the street, the magic eye of radar operates continuously, unaffected by weather or climate. Completely electronic, it is according to manufacturer dependable, accurate, and versatile. With no need for pavement excavation, the Model RD-1 Detector is readily moved or adjusted to roadway changes.

For more details circle No. 88
on enclosed return postal card.

Traffic Surveys

Streeter-Amet Co., Grayslake, Ill., have issued a bulletin describing their time tested device for traffic counting. Called the Traficounter, Jr., traffic volume is easily read on direct reading counter. It is pneumatically actuated by means of the road tube attachment.

For more details circle No. 89
on enclosed return postal card.

Speed Timer

Bulletin gives full details on the new "Speed-Watch," the electrical timing system that automatically "clocks" the vehicle as it passes between two road tubes and the speed registered will be shown in M.P.H. on a large, clear dial. Compact and fully portable permitting set-up and effective operation by a single officer. Traffic House, Inc., Marshall, Mich.

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on enclosed return postal card.

Brief Case Recorder

Literature describes a Walkie-recordall brief case-conference-recorder. Specifically designed for law enforcement agencies it can be used for investigations, lectures, dictation, interviews, conferences and training. Fully automatic, it can record within 60 feet in or out of closed brief case. Miles Reproducer Co., Inc., 812 Broadway, New York 3, N. Y.

For more details circle No. 91
on enclosed return postal card.

Back-Up Alarm

A mechanically operated alarm for vehicles that is sounded when the vehicle is placed in reverse motion is featured in this bulletin. An explanatory diagram of the unit, as well as installation instructions, are included. E. D. Bullard Co., 2680 Bridgeway Blvd., Sausalito, Calif.

For more details circle No. 92
on enclosed return postal card.

Sirens

Federal sirens and flashing lights for emergency vehicle equipment such as fire engines, ambulances, and police cars, are presented in this folder. The various models are pictured, described in detail. Federal Sign and Signal Corp., 8755 S. State St., Chicago 19, Ill.

For more details circle No. 93
on enclosed return postal card.

Tuthill Highway Guards

Illustrated folder giving full details on Tuthill highway I-Beam guard rails. Specifications and features are discussed. Tuthill Spring Co., 760 W. Polk St., Chicago, Ill.

For more details circle No. 94
on enclosed return postal card.

Tire Chains

Literature describes "Weed-V-Bar" tire chains for both duo and single pneumatic tires. Rugged, long lasting, they are bar-reinforced to provide better traction on ice or snow. American Chain and Cable Co., Bridgeport, Conn.

For more details circle No. 95
on enclosed return postal card.

Traffic Signs and Reflective Pavement Marking

A new, revised catalog covering its complete line of traffic control signs and reflective materials has been released by Cataphote Corp., Toledo 10, Ohio. All signs with standard legends and meeting State and U. S. Standard specifications are described in this buying guide plus special signs, posts and mounting Accessories.

For more details circle No. 96
on enclosed return postal card.

Safety Wheel Block

Bulletin describes how you can avoid the danger of your truck creeping away from the loading dock, or other parking hazards, by the use of a safety wheel block. Easy to set or remove, the special alloy steel block is said to hold fast on every surface. Calumet Steel Castings Corp., 1636 Summer St., Hammond, Ind.

For more details circle No. 97
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Congress Program

From Page 48

ing operators to prevent passenger accidents in a paper titled: "Selling Passenger Safety to the Operator."

The public relations aspects of a good safety program will be discussed by the transit industry's foremost exponent of advertising and publicity, Bruce Howat, editor of *Mass Transportation* magazine in a paper entitled "Can Safety Be News?"

The program will also include a new idea for the handling of the problem operator as developed by the Cleveland Transit System. This will be presented by Carl F. Ramsey, chief station supervisor, Cleveland Transit System. Title of his talk is "A Clinical Approach to Operator Improvement."

Hyman Feldman, director, Surface Maintenance Department, New York City Transit Authority, will talk about the problems of maintaining a safe vehicle. Title of his paper is "The Mechanical Department's Role in Safety."

The prevention of employee injuries, a problem of top interest to the transit industry will be discussed by William I. Little, superintendent, transportation division, Transit Department, New Orleans Public Service, Inc. under the title "Employee Safety."

Repeating a popular feature of past Transit Section programs, an entire half-day session will be devoted to workshop sessions and the three topics to be discussed will be "Discipline as Used to Improve Work Performance," "What Kind of a Medical Program Should You Have?" and "Techniques for Getting Names of Potential Witnesses." Discussion leaders will be Charles E. Keiser, superintendent of transportation, Chicago Transit Authority; M. E. Sternburgh, director of safety, New York City Transit Authority; E. A. Thiel, director accident prevention, Columbus (Ohio) Transit Co., and M. G. Bullock, supervising engineer, Transit Casualty Co., St. Louis, Mo.

The Thursday morning session will be sponsored jointly by the Commercial Vehicle and Transit sections. Presiding officer will be Walter F. Carey, president, Automobile Carriers, Inc., Flint, Mich., and vice president for traffic and transportation of the National Safety Council. Principal speaker will be Dr. Preston Bradley, pastor of The Peoples Church of Chicago, who will give an address—"Do We Drive As We Live?".

Following Dr. Bradley's address, awards will be presented to winners of the 1956-57 National Fleet Safety Contest by E. G. Cox of the Interstate Commerce Commission.

At noon, representatives of award winning fleets and their guests will be honored at a luncheon sponsored by General Motors Corp., Detroit.

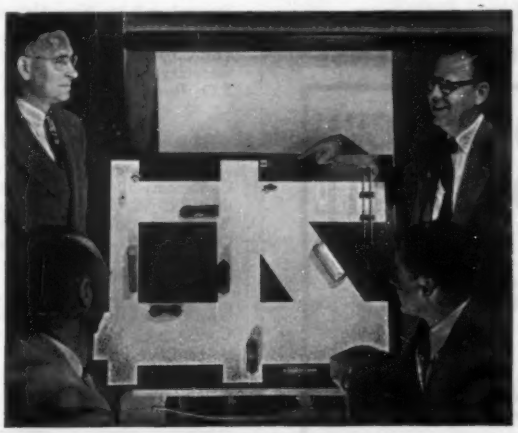
Joint Efforts Produce Traffic Safety Film

The thousands of moviegoers in 800 California movie houses who saw the latest film production of the California Traffic Safety Foundation have no idea of the number of willing hands that worked on the five-minute short.

The year 1956 marked California's blackest year from the standpoint of traffic deaths. CTSF wanted to move fast. They submitted a staff-written script to Warner Bros. studios with the request that a short be produced starring the Warner star Clint "Cheyenne" Walker. Warner's executive producer, Bill Orr, lost no time in replying that they would make the picture.

National Screen Service Corporation agreed to distribute prints for free; General Film Laboratories handled processing below cost; du Pont contributed thousands of feet of raw stock; Motion Picture Service Co. made the titles; major theater chains and independents in the state agreed to run it. The CTSF didn't hear one "No."

The short, in which six-foot-eight star "Cheyenne" Walker depicts the dangers of the old West vs. the highway menaces of today, started with 150 first-runs during the week beginning June 26.



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COMING EVENTS

Sept. 16-20, Miami Beach, Fla.

Annual Convention International Municipal Signal Ass'n. (Hotel Fontainebleu). Irvin Shulsinger, secretary, 130 W. 42nd St., New York 36.

Sept. 17-19, Cleveland

Nineteenth Annual Ohio State Safety Conference (Hotel Carter). H. G. J. Hays, secretary-treasurer, Ohio State Safety Conference, Suite 514, 2073 E. Ninth St., Cleveland 15.

Sept. 23-26, Montreal, Canada

Annual Meeting of the American Transit Association (Sheraton-Mt. Royal Hotel). Arthur W. Baker, general secretary, 292 Madison Ave., New York 17.

Sept. 24-27, Roanoke, Va.

Twenty-fifth Annual Conference of the American Association of Motor Vehicle Administrators (Hotel Roanoke). L. S. Harris, executive director, 912 Barr Bldg., Washington 6, D. C.

Sept. 28-Oct. 3, Honolulu, Hawaii

Sixty-fourth Annual Conference International Association of Chiefs of Police (Royal Hawaiian Hotel). Leroy E. Wike, Mills Bldg., Pennsylvania Ave. at 17th St., Washington 6, D. C.

October 21-25, Chicago

Forty-fifth National Safety Congress & Exposition (Conrad Hilton Hotel). R. L. Forney, secretary, National Safety Council, 425 N. Michigan Ave., Chicago 11.

Nov. 7-8, Seattle Wash.

Northwest Safety Conference (New Exhibition Hall, Olympic Hotel). William A. Feathers, manager, Seattle-King County Safety Council, 1014 Third Ave., Seattle. 4.

Nov. 7-8, Spartansburg, S. C.

Twentieth Annual South Carolina Accident Prevention Conference. J. Donald Watson, Jr., conference secretary-treasurer, c/o South Carolina Industrial Commission, P.O. Box 539, Columbia, S. C.

Nov. 13-15, San Francisco

National Conference on Standards (St. Francis Hotel), Cyril Ainsworth, technical director, American Standards Ass'n., 70 E. 40th St., New York 17.

Nov. 15, Denver, Colo.

Governor's 1957 TeenAge Traffic Safety Conference, West High School, Denver, Colo. Contact same as July 12 conference. Advance registration and governor's reception, November 15, Cosmopolitan Hotel.

December 9-10, New Orleans

Louisiana Safety Association Conference (Roosevelt Hotel). Charles E. Doerler, secretary, Louisiana Safety Association, P.O. Box 1147, Shreveport, La.

1958

Jan. 30-31, Milwaukee, Wis.

Sixteenth Annual Mid-Winter Safety Conference and Exposition (Hotel Schroeder). R. W. Gillette, executive director, Wisconsin Council of Safety, Room 234, One W. Wilson St., Madison 2, Wis.

Mar. 2-4, Memphis, Tenn.

Southern Safety Conference. W. L. Groth, executive director, Southern Safety Conference, Inc., P.O. Box 8927, Richmond, Va.

March 17-18, Boston

The 37th annual Massachusetts Safety Conference and Exhibit at the Hotel Statler, Boston; directed by Bruce Campbell, manager, and Bert Harmon, assistant manager, Massachusetts Safety Council, 31 State Street, Boston 9, Massachusetts.

March 17-19, Los Angeles

Western Safety Congress and Exhibits. Joseph M. Kaplan, manager, Greater Los Angeles Chapter, National Safety Council, 3388 West Eighth St., Los Angeles 5, Calif.

Mar. 18-19, Ft. Wayne, Ind.

Northeastern Indiana Safety Conference and Exhibit. Ivan A. Martin, manager, Safety Council, Chamber of Commerce, Ft. Wayne 2.

March 25-27, Pittsburgh

Thirty-third Annual Western Pennsylvania Safety Engineering Conference and Exhibit (Penn-Sheraton Hotel). Harry H. Brainerd, executive manager, Western Pennsylvania Safety Council, Inc., 605 Park Bldg., Pittsburgh 22, Pa.

Apr. 9-11, Gainesville, Fla.

Fifth Annual Conference on Accident Prevention Engineering (University of Florida). Donald B. Wilcox, conference coordinator, Dept. of Industrial Engineering, University of Florida, Gainesville, Fla.

Apr. 22-24, Columbus, Ohio

Twenty-eighth All-Ohio Safety Congress and Exhibit (Deshler-Hilton Hotel). Arthur W. Moon, congress manager, Room 611, Ohio Dept. Bldg., Columbus 15, Ohio.

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Don Berry Joins Northwestern Faculty

Dr. Donald S. Berry joined the faculty of Northwestern University, Evanston, Ill., July 15. He is Professor of Civil Engineering and will teach graduate work in traffic engineering, highway planning and urban transportation.

Dr. Berry will cooperate with the University's new Transportation Center in its programs of research and education.

He was Professor of Transportation at Purdue University, West Lafayette, Ind., and prior to that had been assistant director, Institute of Transportation and Traffic, University of California, Berkeley.

Dr. Berry was formerly director of the National Safety Council's Traffic and Transportation Division.

NSC Publishes New Bike Booklet

"Fun on a Bike," the National Safety Council's successor to "Sammy Sprocket," its popular code booklet for bicycle riders.

Traffic Safety

FORMERLY PUBLIC SAFETY

A NATIONAL SAFETY COUNCIL PUBLICATION

VOL. 1 No. 2
SEPTEMBER 1957

RESEARCH REVIEW

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The *Research Review* is a quarterly supplement published by *TRAFFIC SAFETY* for the complete reporting of research related to traffic safety. The National Safety Council and *TRAFFIC SAFETY* offer this service to those researchers, technicians, etc. in the field because there is no similar outlet for publication of their findings.

The opinions expressed and conclusions drawn are entirely those of the various authors of these papers. *TRAFFIC SAFETY* and the National Safety Council accept no responsibility for them, and publication should not be deemed as either endorsement or approval of the ideas expressed or devices described.

Manuscripts appropriate for publication should be submitted to the Research Division of the National Safety Council, 425 North Michigan Ave., Chicago 11. Manuscripts cannot be returned unless accompanied by a self-addressed, stamped envelope. Editorial handling will be easier if manuscripts are typed, double-spaced and in triplicate.

Analytical and Mathematical Studies of Accident Causation

Report No. 8

How to use Statistical Control Methods to - - -

REDUCE AND CONTROL HIGHWAY ACCIDENTS

by John F. Horwath

EDITOR'S NOTE: Some of our readers may have wondered why the research paper "Analytical and Mathematical Studies of Accident Causation," based on industrial accident experience, was presented in our first issue. Frankly, the editors felt the origin of these studies was important, in view of the fact these techniques have been applied to the highway accident problem (Horwath and Schreiber in this issue). It was also hoped that industrial safety experts might thus focus their attention on the highway accident problem, drawing on their experience in industry to find a solution to some of the problems that vex traffic safety officials.

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*Dunlap and Associates, Inc., 429 Atlanta Street, Stamford, Conn., 1955.

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. . . Connecticut's Merritt Parkway - - - our data site

ABSTRACT

The purpose of this study was to extend the application of statistical control techniques from toll roads to semi-toll roads. This development necessitated the design of sampling procedures for extending toll gate counts of traffic volumes to the remainder of the roadway. The techniques were applied to data from Connecticut's Merritt Parkway for 1952 and 1953. The results showed that 1) accident rates are "out of control" in the toll station areas, 2) the accident rates for the western half of the Westbound traffic lane are much higher than would be expected and 3) accident rates for Sundays are two to three times as high as other days of the week. The methods also isolated sections of the roadway that had rates significantly higher than the remainder.

Acknowledgments

The authors wish to extend their appreciation to the Connecticut State Highway Commissioner and his staff, particularly E. W. Osterhoudt, Robert Williston, Israel Zevin and Paul Marshall for furnishing us with the data and the facilities that made this report possible.

"This study was sponsored by the Commission on Accidental Trauma of the Armed Forces Epidemiological Board and supported by the Office of the Surgeon General, Department of the Army."

The opinions expressed in this report are the authors' and do not necessarily represent the views of either the State of Connecticut or the Defense Department.

I. Objectives of the Study

A previous report[1] describes the development and pilot application of statistical control techniques for the detection and isolation of accident causing factors in highway systems. The method of analysis involves the comparison of accident rates for sectors of the highway with the overall accident rate for the highway as a whole. The primary power of the tool resides in the development of "control limits," accident rates which form the line of demarcation between "chance" variation in the rates and variation due to changes in the underlying causal system.

The establishment of these limits enables the detection of high-risk sectors of the highway with a strong enough degree of confidence to justify further investigation and remedial action. The application of statistical control techniques also has the virtue of requiring parallel consideration of exposure factors (such as car volumes), and permits organization of the data to obtain any desired level of sensitivity.

The previous report on this technique included a pilot application to the traffic accident and volume data of a major eastern toll highway system. The results of that study demonstrated the power of statistical control techniques for obtaining valuable information about variations in accident-causing factors along the roadway. That study was perhaps the simplest appplication because the toll system enables the administrators to maintain exact records on traffic volumes, hence vehicle miles are easily computed.

The research reported here extends the methods of the previous report to highway systems where there is incomplete information on traffic volumes, thus more closely approximating the situation which exists on the majority of the nation's highways. The specific purposes of the study were 1) the extension of the techniques, 2) further illustration of the productivity of the techniques and 3) illumination of problems that will be encountered by highway administrators in their routine application of the methods.

II. Procedure

A. Choice of the Data Site

The general requirements for a data site were that the road to be considered have only partial information available on traffic volumes. The Merritt Parkway in Connecticut is such a roadway. It is a four-lane divided highway approximately 37.5 miles long; at its western end it connects with the Hutchinson River Parkway at the New York state line and at its eastern end, with the Wilbur Cross Parkway, near New Haven, Conn. This road carries much of the passenger vehicle traffic between New York and New England. House trailers, commercial vehicles and trucks are prohibited.

Toll Station Check

Toll stations are located at each end of the road and accurate counts of the number of car entering and exiting from the parkway at either end are maintained. However, there are a number of free entrances and exits along the length of the road. Hence, accurate traffic volumes are available only for those sections immediately adjacent to the toll stations. Estimates must be made for other sections. The State Highway Department uses road counters from time to time to estimate those volumes for purposes of design.

A record of all accidents occurring on the Merritt Parkway during 1952 and 1953 was obtained from the Connecticut State Highway Department. The record included direction of travel, location of the accident, month, day and hour of occurrence, weather conditions and visibility.

B. Estimation of Traffic Volumes

The most recent sample of traffic densities along the highway was taken in 1946. The growth of some of the communities along the parkway, and the general national increase in automobile registration made it desirable to obtain more recent figures. These data made it possible to project the 1952 and 1953 toll station volumes along the highway to obtain estimates of the traffic volume at any location for either year.

Traffic Count Made

The investigators placed pneumatic recording counters along the highway at 5-mile intervals. Traffic densities for the week of January 3, 1955 were obtained separately for eastbound and westbound traffic. The recording device provided hourly totals. Thus it was possible to obtain hourly, daily and weekly estimates of volumes. From these

[1]Norden, Monroe and Jacobs, Herbert. *Development and application of statistical control techniques to toll road accident data.* Dunlap and Associates, Inc., Stamford, Connecticut. Analytical and Mathematical Studies of Accident Causation, Report No. 3.

. . . point out of control rings warning bell

data, a distribution of car volumes for that week along the parkway could be plotted. The toll station data at the terminals of the highway provided verification of the sample counts.

The distribution of car volumes obtained is presented in Figure 1. The westbound volume closely approximates the eastbound volume, especially at the New York (west) end of the parkway. The New Haven (east) end of the parkway shows some differences between the eastbound and westbound traffic densities, especially at the 25 and 30-mile points.

Yearly Estimates Needed

The nearly identical volumes for eastbound and westbound volumes at both ends of the highway provided a clue that the other differences were due to sampling error. Since January is a relatively low density month, and since only one week in January was sampled, this hypothesis grew in importance. In addition, the highway planning personnel had found in their studies that any yearly difference in eastbound and westbound traffic volumes was small enough to be negligible. Consequently, for the purpose of this study, it was assumed that eastbound and westbound traffic volumes were equal.

It remained to obtain yearly estimates of traffic volume for each one-mile interval. If each interval could be said to represent some constant proportion of the toll station

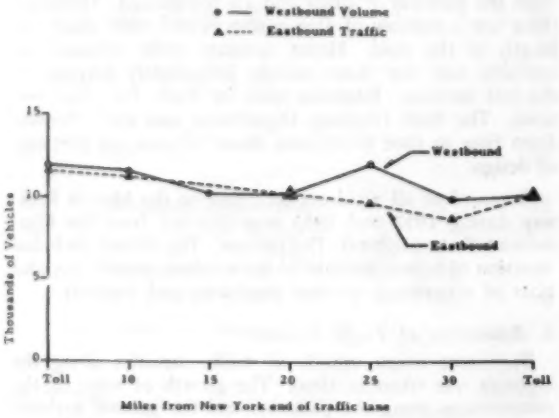


Figure 1. Average daily traffic, January 3-10, 1955 sample.

volumes, the toll station data could be multiplied by this factor to estimate the local volumes. From Figure 1 it can be seen that a straight line drawn between the points representing the toll station volumes represents all of the data very well. The largest error is only about 5 per cent. Thus, the assumption that traffic volumes decrease linearly with the distance from the New York end of the road could be accepted without serious error.

The 1952 terminal (toll) volumes were plotted on a graph; the abscissa was mileage and the ordinate volumes. A straight line was drawn between the two points and the ordinate of that line at each one mile interval was used as the estimate of traffic volume. This procedure was repeated for the 1953 data. Volumes for each one-mile interval were halved to estimate eastbound and westbound volumes.

Checking for Error

There was one further source of error in this procedure. It can be seen, logically, that traffic volumes for any two adjacent one-mile intervals that both lie between two interchanges must be identical. This procedure assumes that the volumes change as noted. Actually, this error was small. The volume at the western end of the parkway exceeded that at the eastern end by only 50 per cent, and thus the volume estimates changed from mile to mile by only 1.33 per cent, a small error indeed.

C. Computation of Accident Rates and Control Limits

Accident rates per ten million vehicle miles were computed for each one-mile section of the highway for 1952 and 1953. These were plotted against distance for eastbound and westbound traffic for each year. The westbound lanes showed two distinct and separate rate levels, high at the New York end and low at the New Haven end. The eastbound lanes exhibited slightly higher rates at the New Haven end than at the New York end. Consequently it was decided to treat the New Haven section of the road separately from the New York section, computing separate mean rates and control limits for each.

Chance Reduced to a Formula

The control limits used in this analysis are 1 per cent limits. If all the one-mile intervals have the same true accident rate, the probability that any one rate will exceed the control limits due to chance is 1 in 100. In addition, the probability that the rate will fall beyond one specified limit is 1 in 200.

If a rate does fall outside of the control limits, the chances are very good that this was not a chance deviation, but that some other cause was present. It should be made clear that the converse is not true: if a point does not fall beyond the control limits, it *does not* indicate that this section does have a rate equal to the overall rate. In addition, because of the nature of this technique, the same differences in causal systems are not detected every year. An interval may show a point out of control only once in, say, five years; nonetheless, it is a real indication.

In computing control limits, we used these formulae:

$$\text{Upper Control Limit (UCL)} = r + {}'.005\sqrt{r/m} + \frac{({}'.005)^2 + 4}{8m}$$

$$\text{Lower Control Limit (LCL)} = r - {}'.005\sqrt{r/m} + \frac{({}'.005)^2 - 4}{8m}$$

where r=accident rate, m=car miles, and $'.005$ is the normal deviate exceeded with probability .005, which is, in this case, 2.5758. Note that the limits vary inversely as the square root of the car miles driven on that section.

. . . study can show factors tending to lower rate

This increases the degree of confidence one can place in the accident rate for any interval.

We noted very early that an abnormally large number of accidents occurred near the western toll station, and consequently these were removed from consideration. One might consider that these accidents did not really occur on the highway, but within the confines of the toll station.

Rule Out Toll Station Accidents

Control charts were prepared for eastbound and westbound lanes for the two years by one-mile intervals and by two-mile intervals. Use of the two-mile interval narrows the control limits and thus increases the sensitivity of the techniques, but it forfeits the ability to be able to locate the accident producing section within one mile.

D. Additional Analyses

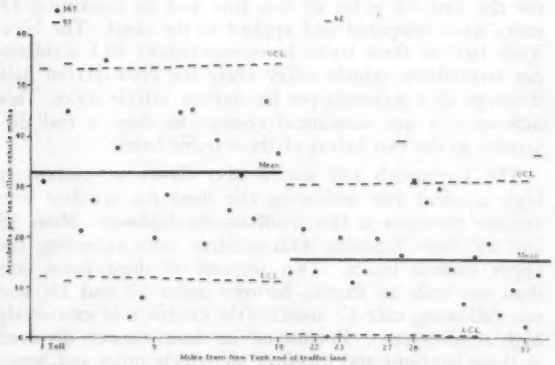
The control chart analysis isolates those sections of the highway which show extraordinary accident rates. After this step, we must assign causes to those effects. The usual procedure is to look for causes whose presence has resulted in similar occurrences elsewhere.

Similarly, in the highway situation, the administrator must look for the effects of type of pavement, weather, etc. One of the main problems in this search is to determine which one or more of the possible causes was actually present in the particular section of the road. It is suggested that the accident rates for all of these factors be separated and compared to determine which ones actually had the greater effects.

In this application of statistical control techniques to the Merritt Parkway, accident rates in various weather conditions, hours of the day, day of the week, etc. are isolated for this kind of supplementary study.

III. Results

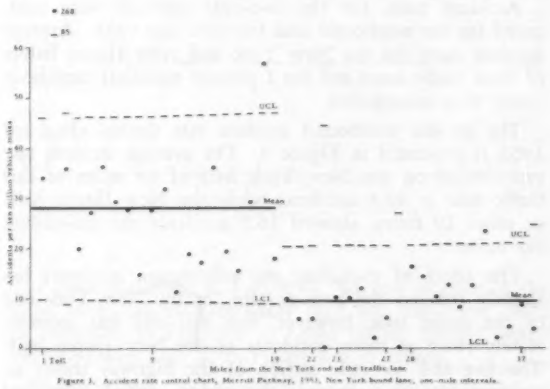
The accident rates derived for the eastbound and westbound traffic lanes showed essential differences in the accident experience of the two traffic lanes.



A. Westbound Traffic Lanes

The control chart for the New York bound traffic lane for 1952 is presented in Figure 2. As you can see from this control chart, accident rates decrease progressively from New York to New Haven. A sharp change in accident rates take place 20 miles from the New York end of the traffic lane. Calculation of the average accident rate for the first 19 miles of this lane yields an average rate of 32.6 accidents per ten-million vehicle miles while the following 18 miles of this traffic lane yields an average accident rate of only 15.5 accidents per ten-million vehicle miles. Thus the accident rate for the New York half is twice as great as that experienced on the New Haven half of these traffic lanes.

This relationship between the New York and New Haven halves of the New York bound lane is also apparent in the accident rate control chart derived from 1953 data.



Low Accident Rate

Figure 3 shows an average accident rate of 28.0 for the New York half, while that for the New Haven half develops only 9.3 accidents per ten-million vehicle miles. Here the New York half of the westbound traffic lanes shows a rate approximately three times as great as that experienced by the New Haven half of the same traffic lanes. Again the sharp change in rates at the 18-mile point is apparent. There can be no question but that this is a real and not a chance difference. The magnitude of this difference in accident rates is such as to suggest careful and extensive investigation of all potential differences in the causal system.

Both the 1952 and 1953 control charts show that the accident rate at the Greenwich toll station (near the New York end) greatly exceeds the upper control limit, suggesting the presence of assignable causes for the high number of accidents occurring at this point. Likewise in 1952 (Figure 2), the accident rate at the 5 and 28-mile points exceed the upper control limit and bear investigation for assignable causes of the high accident rate

. . . accident rate doubles on New York side

experienced here. Miles seven and eight show rates far below the lower control limit. They suggest the presence of factors which resulted in this unexpectedly low accident rate, and suggest that this area of the traffic lane should be studied for possible indications of factors that tend to yield a desirably low accident rate.

To obtain additional information about the significance of the accident rates for the westbound lanes, the toll station accidents and associated vehicle miles were excluded and one-mile accidents with related vehicle miles were regrouped into two-mile units. The regrouping into two-mile sections increases the vehicle miles used in computing rates, bringing the 1 percent confidence limits closer to the mean.

This effect might show additional sections with unusually high accident rates and increase the yield of this analytical method.

Recompute Confidence Limits

Accident rates for the two-mile sections were computed for the westbound lane for 1952 and 1953. Average accident rates for the New York and New Haven halves of these traffic lanes and the 1 percent statistical confidence limits were recomputed.

The revised westbound accident rate control chart for 1952 is presented in Figure 4. The average accident rate experienced on the New York half of 18 miles of this traffic lane is 30.4 accidents while the New Haven half, or other 19 miles, showed 16.5 accidents per ten-million car miles.

The effect of excluding the toll station accidents has slightly reduced the average rate for the New York end of the traffic lane, however, this half still has approximately twice as many accidents as the New Haven half. The five and six mile section of the highway shows an accident rate that exceeds the upper control limit and suggests the presence of causal factors conducive to accidents at this location.

The section five miles from the New York end of this traffic lane also had an excessively high accident rate in the 1952 one-mile interval chart presented in Figure 2.

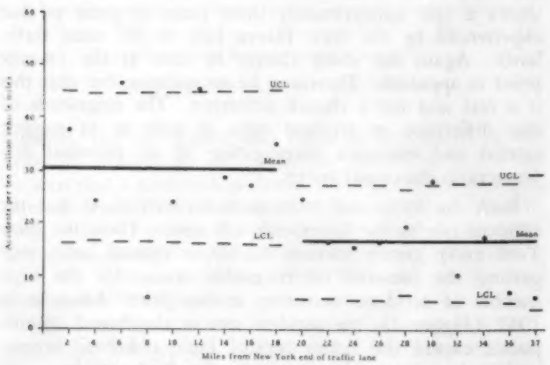


Figure 4. Accident rate control chart, Merritt Parkway, 1952, New York bound lane, two-mile intervals.

This information is not new, but miles 11 and 12 show a rate in excess of the upper control limit which was not apparent in Figure 2. This identification of an additional section of the traffic lanes in need of study is a direct result of narrowing the control limits by combining mile intervals into two-mile intervals. Miles seven and eight also show a low accident rate which falls below the lower control limit. Miles 29 and 30 remain out of control, as in Figure 2.

The 1953 plot of the two-mile rates for the westbound lane is presented in Figure 5. This control chart indicates an average rate of 27.1 accidents for the New York half and an average rate of 9.8 accidents for the New Haven half of these traffic lanes. The same sections of the traffic lane (miles 17 and 18, and 33 and 34) are shown to have excessively high accident rates. No additional sections of the highway were identified as a result of this recomputation.

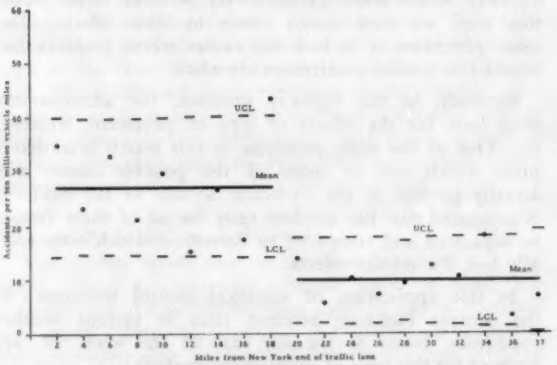


Figure 5. Accident rate control chart, Merritt Parkway, 1953, New York bound lane, two-mile intervals.

B. Eastbound Traffic Lanes

Accident rates for one-mile sections of the New Haven bound traffic lanes for 1952 are shown in Figure 6. Because of the apparent increase in accident rates toward the New Haven end of this traffic lane, separate average rates for the first 19 miles of this lane and its remaining 18 miles were computed and applied to the chart. The New York half of these traffic lanes experiences 20.1 accidents per ten-million vehicle miles while the New Haven half develops 23.4 accidents per ten-million vehicle miles. This difference is not substantial enough to show a real difference in the two halves of these traffic lanes.

The Greenwich toll station also shows an excessively high accident rate indicating the need for accident prevention measures at this point on the highway. Miles 18 and 28 show locations with accident rates exceeding the upper control limits. Two sections of these lanes, less than one mile in length, between miles 27 and 28, and one following mile 37, indicate the existence of excessively high accident rates. Because of the short distance involved at these locations and its effect on vehicle miles and hence

. . . hot spots located along test route

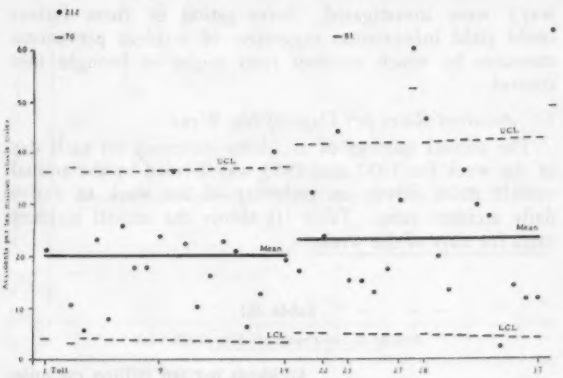


Figure 6. Accident rate control chart, Merritt Parkway, 1952, New Haven bound lane, one-mile intervals.

on the control limits, interpretation of these findings must be restricted and less emphasis is placed on investigation of these sections.

The 1953 accident rate control chart for the New Haven bound traffic lanes is shown in Figure 7. As observed on all control charts for the Merritt Parkway, the toll station rate greatly exceeds that experienced on other sections of the parkway. The average rate experienced on the New York half of the traffic lanes is 21.6 accidents while the New Haven half reports 18.9 accidents per ten-million vehicle miles. One-mile sections that experience excessive accident rates are miles 6 and 21. These are sections to which attention should be directed for accident prevention and reduction.

Exclude Toll Stations

In order to identify additional sections of the highway in need of attention for traffic control and accident reduction, toll station accidents and associated vehicle miles were excluded and the one-mile sections were combined into two-mile sections which increased the vehicle miles used in computing rates and in turn brought the control limits closer to the mean.

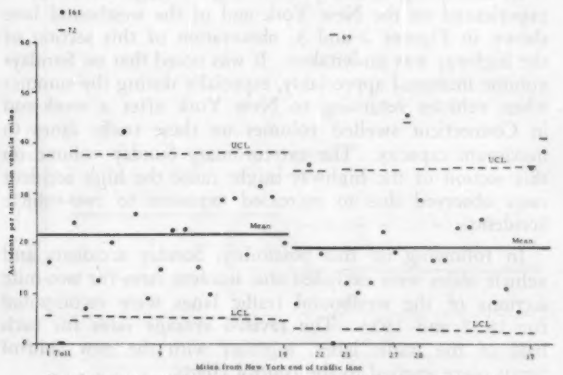


Figure 7. Accident rate control chart, Merritt Parkway, 1953, New Haven bound lane, one-mile interval.

The revised two-mile accident rate control chart for 1952 is presented in Figure 8. Because of the slight difference between the average rates for the New York half and the New Haven half of these traffic lanes and the observation that their relationship was not constant, it was assumed that the rate distribution along them were homogeneous and therefore one average rate for the entire length of the traffic lanes was applied. This rate for 1952 was 21.1 accidents per ten-million vehicle miles. Miles 27 and 28 are identified as the sections of the highway in need of accident prevention measures. The excessive rate identified for this section was likewise identified on the 1952 one-

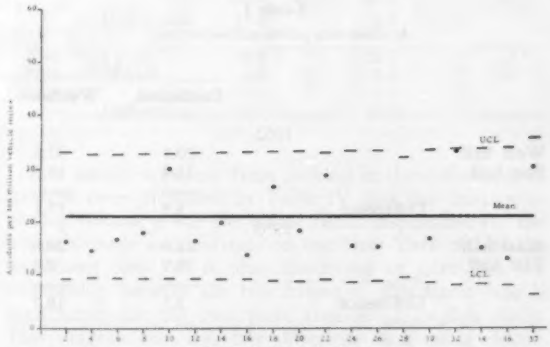


Figure 8. Accident rate control chart, Merritt Parkway, 1952, New Haven bound lane, two-mile intervals.

mile chart illustrated in Figure 6. No new sections of the traffic lanes exhibit excessively high accident rates. Mile 18 identified in Figure 6 as being out of control, when combined with mile 17 in Figure 8 is in control.

Figure 9 shows the two-mile accident rate control chart for the New Haven-bound traffic lanes for 1953. A mean rate of 19.8 accidents per ten-million vehicle miles is observed. The accident rates at mile 5 and 6, and 37 exceed the control limits. They are excessive. Mile 6 section of this traffic lane had previously been identified as showing

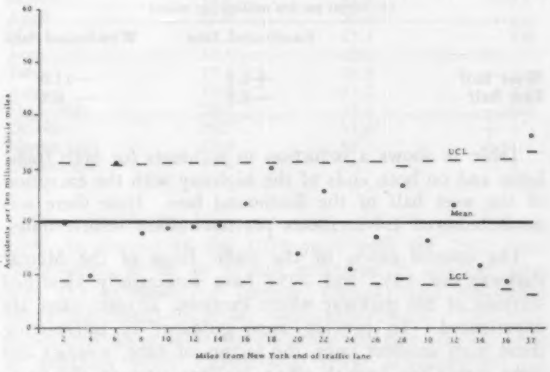


Figure 9. Accident rate control chart, Merritt Parkway, 1953, New Haven bound lane, two-mile intervals.

. . . more accidents occur at terminal points

an accident rate exceeding the control limits. However the identification of the 37-mile end of the eastbound as an excessively high accident rate area only becomes apparent in Figure 9. Figure 7 showing the one-mile rates, shows accident rates in this area approaching the upper control limit but not exceeding it.

C. Comparisons of Halves of the Highway

In reviewing the mean accident rates per ten-million car miles presented in the control charts, there are several interesting results. These rates are shown grouped in Table I below, broken down by traffic lane and halves of the highway.

Table I

Accident rates per ten million car miles.

		Lane	
		Eastbound	Westbound
	1952		
West half		20.1	32.6
East half		23.4	15.5
	Difference	3.3	17.1
	1953		
West half		21.6	28.0
East half		18.9	9.3
	Difference	2.7	18.7

On the western half of the highway, the eastbound lanes' accident rate is lower by 12.5 accidents in 1952 and 6.4 accidents in 1953 than the accident rates on the westbound lanes. Likewise, on the eastern half of the highway, the eastbound lane accident rate is greater by 7.9 accidents in 1952 and 9.6 accidents in 1953. These results suggest that the accident rates are higher at the terminal of the traffic lanes as compared with their origin.

In analyzing the changes in 1952 and 1953 accident rates for positions of the highway and for traffic lanes, an improvement in accident rate for 1953 is apparent. Table II summarizes them.

Table II

The Differences between 1952 and 1953 Accident Rates.
(accidents per ten million car miles)

	Eastbound lane	Westbound lane
West half	+1.4	—11.0
East half	—4.5	— 6.1

Table II shows a reduction in accidents for both traffic lanes and on both ends of the highway with the exception of the west half of the Eastbound lane. Here there was an increase of 1.4 accidents per ten-million vehicle miles.

The control charts of the traffic lanes of the Merritt Parkway for 1952 and 1953 have successfully identified sections of the parkway where excessive accident rates are experienced. To provide some guidance in interpreting these high accident rates, the factors of time, weather and light conditions (which affect accident rates on the parkway) were investigated. Investigation of these factors could yield information suggestive of accident prevention measures by which accident rates might be brought into control.

D. Accident Rates for Days of the Week

The annual number of accidents occurring on each day of the week for 1952 and 1953 was divided by the annual vehicle miles driven on each day of the week to derive daily accident rates. Table III shows the annual accident rates for days of the week.

Table III

Annual accident rates for days of the week

	Accidents per ten million car miles	
	1952	1953
Sunday	44.7	42.0
Monday	24.3	20.1
Tuesday	17.2	12.5
Wednesday	26.7	10.7
Thursday	18.1	18.4
Friday	17.0	19.9
Saturday	27.1	23.6

The accident rate for Sunday is approximately twice as great as Saturday, the day with the highest rate. Clearly, Sunday stands out as the day on which accident prevention measures should first be applied for improvement of highway safety. The general trend toward high weekend rates versus low weekday rates is apparent for both years. The Wednesday rate for 1953, however, shows a substantial improvement of 16 accidents fewer per ten-million car miles in 1953.

In reviewing the Sunday accidents, it was found that approximately one-third of all accidents experienced on the parkway in 1952 and 1953 occurred on Sunday. Likewise, the accident rate for both years (Table III) showed that the Sunday accident rate is approximately twice as great as that experienced on Saturdays, the next highest daily rate.

In attempting to interpret the high average accident rate experienced on the New York end of the westbound lane shown in Figures 2 and 3, observation of this section of the highway was undertaken. It was noted that on Sundays volume increased appreciably, especially during the summer when vehicles returning to New York after a week-end in Connecticut swelled volumes on these traffic lanes to maximum capacity. The extraordinary Sunday volume on this section of the highway might cause the high accident rates observed due to increased exposure to two-vehicle accidents.

In following up this possibility, Sunday accidents and vehicle miles were excluded and accident rates for two-mile sections of the westbound traffic lanes were recomputed for 1952 and 1953. The revised average rates for each half of the traffic lanes, together with the new control limits were applied to the control charts.

. . . Sunday drivers fail to hike accident rates

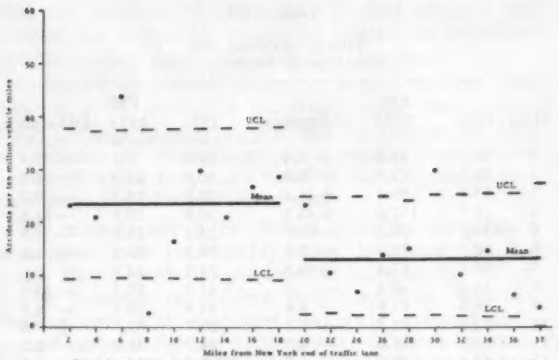


Figure 10. Accident rate control chart, Merritt Parkway, 1952, New York bound lanes, two-mile intervals, Sunday accidents and vehicle miles excluded.

Figure 10 shows the 1952 accident rate control chart for these traffic lanes for the Monday through Saturday accidents. The average accident rate for the New York half of the traffic lanes is 23.5, while the New Haven half shows 13.7 accidents per ten-million vehicle miles. In comparing the distribution of accident rates along the traffic lanes with the distribution presented in Figure 4 (where the Sunday accidents and vehicle miles are included), the similarity in patterns is immediately apparent. With the exception of the 11 and 12-mile section in Figure 4, the same sections of the highway show excessively high accident rates.

The 1953 accident rate control chart for the westbound traffic lanes with Sunday data excluded is presented in Figure 11. The average rate experienced on the New York half of the highway is shown to be 18.7 accidents, while the New Haven end shows 8.4 accidents. In comparing this chart with Figure 5 (where the Sunday data is included), the similarity between the two distributions of accident rates is apparent. With respect to rates exceeding the control limits the mile 5 and 6 rate now exceeds the limits. However, this section was identified in Figure 7. Similarly, miles 18 and 19 are within the limits in Figures 11 and 7, but outside the limits in Figure 5.

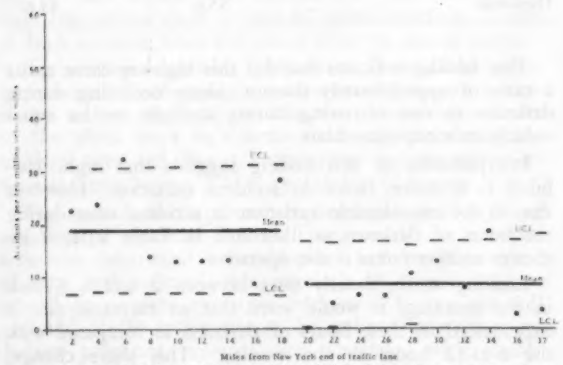


Figure 11. Accident rate control chart, Merritt Parkway, 1953, New York bound lanes, two-mile intervals, Sunday accidents and vehicle miles excluded.

For convenience of comparison, the average rates for each half of the highway for 1952 and 1953 with and without the Sunday data are presented in Table IV.

Table IV

Accident rates for westbound lane

(Accidents per ten million vehicle miles)

	Complete data	Sunday data excluded	Difference
1952			
New York half	32.6	23.5	9.1
New Haven half	15.5	13.7	1.8
Differences	17.1	9.8	
1953			
New York half	28.0	18.7	9.3
New Haven half	9.3	8.4	.9
Differences	18.7	10.3	

It is readily apparent from looking at the differences in accident rates presented in Table IV that the increase in Sunday volume is not the major factor responsible for the higher average accident rate on the New York end of the westbound lane. It is also interesting to note that the relationship between the two halves of this traffic lane is maintained for the two years considered in this study. This suggests that this rate difference is a stable characteristic and is undoubtedly related to differences in existing conditions on the two halves of these traffic lanes.

E. Monthly Accident Rates

A computation of monthly accident rates for 1952 and 1953 is presented in Table V.

Table V

Monthly Accident Rates

(Accidents per ten million car miles)

	1952	1953	Difference
January	21.2	35.9	+14.7
February	56.8	15.9	—40.9
March	34.6	17.2	—17.4
April	22.0	20.6	— 1.4
May	23.2	17.4	— 5.8
June	14.1	12.6	— 1.5
July	17.0	14.6	— 2.4
August	25.8	23.2	— 2.6
September	28.7	18.1	—10.6
October	26.7	31.6	+ 4.9
November	37.8	52.7	+14.9
December	33.9	26.7	— 7.2

The monthly accident rates show a wide range of variation. In comparing the 1952 rates with the 1953 rates there seems to be an overall reduction in accident rates with the exception of January, October and November when substantial increases were experienced. The most substantial decrease in the monthly accident rate occurred in February which shows 40.9 fewer accidents per ten

. . . snow, sleet - - up accidents 4 per cent

million car miles in 1953, a definite improvement. The highest accident rates as well as the greatest change in accident rates in 1952 and 1953 take place in the fall and winter months. During this period approximately 20 per cent fewer vehicles travel the parkway and so, on an accident exposure basis, this higher rate is unexpected. Rates for the six fall and winter months (including October through March), and for the spring and summer months (including April through September) were computed. The resulting rates are presented in Table VI.

Table VI

Seasonal Accident Rates
(Accidents per ten million vehicle miles)

	1952	1953	Difference
October-March	34.7	30.7	4.0
April-September	21.8	17.8	4.0
Difference	12.9	12.9	

The higher accident rate for the fall and winter months is maintained for the two years investigated. It is surprising that the difference between the summer and winter months is identical for 1952 and 1953. This increase of 12.9 accidents during the fall and winter months suggests the influence of winter weather conditions on driving.

In order to determine the effects of weather on accident rates, an estimation of accident rates associated with weather conditions was developed. The rates for various weather conditions are presented in Table VII.

Table VII

Accident rates estimated* for weather conditions
(Accidents per ten million vehicle miles)

	1952	1953
Rain	15.5	13.4
Heavy Fog	10.2	11.7
Snow, Sleet, Ice	138.8	68.6
Clear or Cloudy	28.6	28.7

*Vehicle miles estimated by multiplying annual average daily vehicles by number of days of weather type recorded at New Haven weather station.

The accidents under snow and sleet conditions are outstandingly high. It appears that the higher rate of 26.7 accidents in 1952 for the entire parkway as compared with a rate of 22.5 in 1953 is, in large part, due to snow and sleet conditions. In this category alone, a substantial change in rate has occurred and in this instance the rate has been halved. Fog and rain conditions yield a rate half that observed during clear and cloudy conditions. This is no doubt due to the posting of lower speed limits and the more cautious behavior of drivers under these potentially hazardous conditions.

F. Hourly Accident Rates

Accident rates experienced during the various hours of the day were computed for 1952 and 1953 and presented in Table VIII.

Table VIII

Hourly accident rate
(Accidents per ten million car miles)

Hour	AM 1952	AM 1953	AM Difference	PM 1952	PM 1953	PM Difference
1	36.1	45.2	+ 6.4	14.6	7.2	— 7.4
2	79.3	73.5	— 5.8	20.8	11.3	— 9.5
3	63.0	89.1	+26.1	19.9	10.7	— 9.2
4	68.7	117.0	+48.3	30.8	19.0	—11.8
5	137.1	76.2	—60.9	23.2	19.3	— 3.9
6	80.5	78.5	— 2.0	28.3	26.2	— 2.1
7	39.1	57.4	+18.3	24.3	24.3	0
8	31.0	30.4	— .6	41.2	27.3	—13.9
9	20.6	11.8	— 8.8	34.5	30.1	— 4.4
10	22.3	21.2	— 1.1	25.7	32.7	+ 7.0
11	20.3	15.6	— 4.7	24.7	22.0	— 2.7
12	13.3	12.8	— .5	28.2	26.1	— 2.1
Average	29.8	28.8		25.9	20.5	

The morning accident rate is higher than the afternoon rate in spite of the fact that 70 per cent of the travel on the parkway is done during afternoon hours. In addition, the morning accident rates vary considerably and certain early morning hours show an excessively high accident rate. Scanning the rates, suggests that there is a grouping of high rates during the hours of darkness. The accident rate during darkness is normally much greater than that experienced during daylight.

Accident rates for daylight and darkness were therefore computed for the Merritt Parkway for 1952 and 1953. In the determination of vehicle miles traveled and accidents occurring in daylight and darkness, the recommendation of the National Safety Council was followed and the hours of darkness were assumed to occur between sunset and sunrise. Accident rates derived for travel during daylight and darkness are shown in Table IX.

Table IX

Accident rates for daylight and darkness
(Accidents per ten million car miles)

	1952	1953
Daylight	16.4	15.0
Darkness	55.0	44.6

This finding indicates that for this highway there exists a ratio of approximately three accidents occurring during darkness to one occurring during daylight on an equal vehicle mile exposure basis.

Interpretation of this finding suggests that night visibility is a major factor in accident causation. However due to the considerable variation in accident rates during the hours of darkness as illustrated in Table VIII, it indicates another factor is also operative.

Looking at the hourly rates between 2 and 6 o'clock in the morning, it would seem that an excessive rate is experienced in these hours of darkness as compared with the 6-to-12 hours in the evening. This sharp change, indicating an increase in rate by a ratio of 3 to 1, sug-

. . . study points way to effective method of control

gests the influence of fatigue on accident rates, if one assumes that drivers are maximally fatigued, or more susceptible to sleep during the early morning hours.

Certainly the greatest change in hourly accident rates between 1952 and 1953 occurred during these hours. These findings strongly suggest that the three-to-one ratio of darkness to daylight accidents results from several factors of which two, night visibility and fatigue, account for a good deal of the increased rate.

The main benefit to be derived from the computation of accident rates for monthly, daily, and hourly periods is that they provide insight into the interpretation of excessive variation in accident rates. Accident rates for weather and light conditions also yield valuable background material for the interpretation of excessive variation in accident rates. This background of factors which affect accident rates facilitates the investigation of causes on those sections of the parkway that experience excessive accident rates.

IV. Discussions and Conclusions

Only through the employment of a control chart displaying accident rates for one-mile sections of each traffic lane of a divided highway, is it possible to discover sections of a highway that induce a significantly greater number of accidents than other sections of the same highway. The information is extremely useful to highway planning engineers and traffic engineers for it singles out problem areas where corrective action should be taken.

However, once these highway sections are identified by the use of a control chart, it is then necessary to study the accidents occurring on the sections so identified, in an attempt to identify causes for corrective action.

For example, it may be found that, at one section of the highway with an unusually high accident rate, many more accidents are experienced during snow conditions than on other portions of the highway during like conditions.

Spotting Critical Areas

Thorough analysis of the accident report forms, or observation of this section of the highway during snow conditions, might indicate that early or continued sanding of this section will substantially reduce accidents. Here the control chart is used to point directly to sources of high accident rates and direct effort to critical areas.

In the absence of such information, it would be necessary to treat the highway as a whole with respect to corrective actions. In addition, the use of confidence limits on the chart helps to determine the significance of the accident rates and directs investigation and corrective actions to areas having a high probability of success.

The control chart approach to investigation of highway accidents is essential for any program where accident reduction and control is the objective. In terms of economy of time and material, this approach will yield the best pay-off in accident reduction programs. Before the full potential of the technique can be realized in accident reduction programs, accident rates associated with various time, weather, light and pavement factors should be determined in order to interpret properly the causes of high accident rates associated with a particular section of the highway. On the Merritt Parkway, there is a progressive increase in the accident rate on the westbound traffic lanes. Traffic volume also increases progressively along this traffic lane.

On the eastbound lane, however, the volume progressively decreases eastward on the traffic lanes. We should therefore expect decreasing accident rates along this stretch of highway. However, the effect of driver fatigue and its tendency to increase accidents could very well mask this decrease and maintain the rate at the same level throughout the traffic lane as observed. Further investigation is required to substantiate this hypothesis.

To investigate fully the influence of time, weather, pavement and other conditions on accident rates, it is necessary to accomplish a detailed analysis of the variance of accident rates. The relative influence of these factors on various sections of the highway can then be determined through an analysis of accidents occurring on high rate sections of the highway.

Such investigations will suggest methods by which accident rates could be reduced and an improved rate for the highway obtained. Study of accident causes in this manner will also suggest actions that can be taken to influence the behavior of drivers and thus solve some of the human factor problems associated with accident causation.

The application of statistical control methods for the reduction and control of highway accidents has proved to be highly successful in yielding information that identifies sections of a highway that need accident prevention work. This study suggests that the following actions should be undertaken to reduce accidents:

Name Six Corrective Steps

1. The New York end of the westbound traffic lanes should be studied to determine how to reduce the high accident experience of this section of the parkway. It is quite possible that another traffic lane added to this section of the highway will make a substantial reduction in accidents.

2. Immediate action should be taken to reduce the excessively high accident rate observed at the Greenwich toll station.

3. The accidents which occur on those sections of the parkway which experience excessively high accident rates (those sections whose rates exceed the upper control limits) should be thoroughly studied to look for the causes of these accidents. Accident rates for time, weather and light conditions will provide guidance in determining the methods to be employed for accident reduction and control.

4. Accident prevention measures should be directed to the winter months especially during snow and ice conditions. The rainy weather accident rate suggests that the measures taken to control speed are effective in controlling accident rates.

5. The high accident rate occurring during the early morning hours of darkness suggests that consideration should be given to measures for keeping drivers alert during this period.

6. Continued surveillance over accident rates by control chart methods should be initiated as a positive guide to accident reduction and control.

THE END

FURTHER APPLICATION OF STATISTICAL CONTROL TECHNIQUES TO HIGHWAY ACCIDENT DATA

Prepared for Commission on Accidental Trauma Armed Forces Epidemiological Board

by Robert J. Schreiber

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*"Since the date of this study, the Connecticut Highway Department has instituted further analyses and corrective action based, in part, on this study."

Dunlap and Associates, Inc., 429 Atlantic Street
Stamford, Conn.
1955

NOTE:
Editor's Note: This is the second paper presented on the use of control charts in dealing with motor vehicle accidents. The techniques used were demonstrated in the June issue of RESEARCH REVIEW *in a paper on industrial accident prevention by Sebastian Littnauer. Also in this issue by John E. Horwath. All this research was done under the overall auspices of the Commission on Accidental Trauma, Armed Forces Epidemiological Board.*

I. Introduction

The Problem

The highway engineer is usually confronted with a two-stage accident problem: (1) locating those highway areas which contribute most to accident risk, and (2) taking remedial action designed to eliminate or reduce hazards which have been positively identified. The outcome of the second step is necessarily dependent upon the first.

Isolating those areas which deserve careful investigation because of excessive risk usually involves either the use of personal judgment and experience or some application of the available accident data. Each method involves problems which have been reviewed previously.[1]

It has been demonstrated that techniques for localizing accident producing factors are most effective when they include exposure differences on the one hand and allowances for so called "chance caused variation" on the other. Such a technology was developed and applied to the analysis of accident data for a major highway system for the year 1952.

Previous Work

Briefly, the analytical procedure proposed previously represented an extension of statistical quality control techniques developed for process control in manufacturing. This application developed "control" limits of variation about the average accident rate for the roadway. These limits were designed such that, if the accident rates for all sections were truly equal, then any local accident rate could be expected to exceed either control limit only five

[1]Norden, Monroe, et. al. The *Application of Statistical Control Techniques to the Study of Highway Accidents.* Highway Research Board Bulletin No. 117, 1956.

. . . control charts pinpoint changes in experience

times in 1000 thru the operation of chance alone. When a datum exceeds one of these control limits, the probability is 0.995 (near certainty) that a change this large is not due to chance, but is attributable to a real change in the local accident rate.

The converse of this statement is not true; if a datum does not exceed the control limit, no inferences can be made about the absence of excessive hazard. In fact, if the mean accident rate at any location is only slightly different from the grand mean, the datum point for that location could be expected to fall outside the control limits only one time in five or six. Thus, real differences cannot be expected to be detected during *every* data period; any particular mean rate different from the grand mean may be detected only occasionally.

The control limits are a function of the exposure during the period considered. In this case, car miles were used as the exposure base; as the number of car miles increases, the control limit moves closer to the grand mean. As more data become available, the estimate of the accident rate at any location becomes more reliable. In the limit, with exposure approaching infinity, the computed rate in any locale is the true rate, and not an estimate.

The previous application used control limits comparable to 0.005 probability. The limits could very well have been 0.025, thus increasing the risk of erroneously inferring a different local rate, but also increasing the chance of detecting this difference. In the data to be discussed, the 0.005 limits have been used throughout, but only for illustrative purposes.

Control Chart Helpful

In addition to the use of the control limits, the control chart provides other means of inference. Specifically, in consecutive time periods, a succession of points above or below the mean for any locale indicates a local difference in accident rate. For example, if for four years any stretch of highway shows a rate above the mean, the probability is only 0.025 that this is a chance affair. It is more likely that the mean for this stretch is higher than the grand mean.

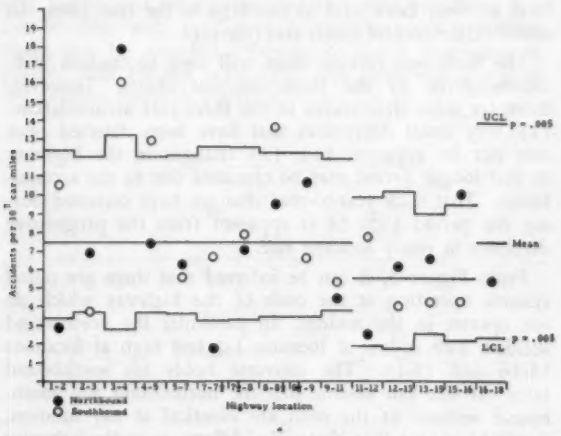

Figure 1. Control chart for accident rates by highway location--1952.

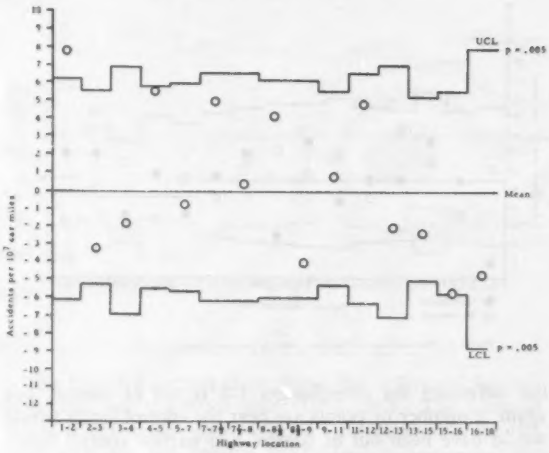

Figure 2. Control chart for Southbound minus Northbound accident rates--1952.

The control charts for the 1952 accident data of a major highway system are shown in Figures 1 and 2. All accidents that occurred during bad weather or off the main highway were not considered. The roadway has been divided into lengths between interchanges except where those distances are very long or very short, and appropriate bisections and combinations have been made as indicated. (For review of the rationale employed in selecting appropriate highway intervals for study, see Norden, *et al.*)

The highway has three lanes in each direction between points 11 and 16 and two in each direction in other locations. Because of the expected difference in accident rate for these two areas, the grand means and limits have been separately computed for the two areas.

From Figure 1, it can be inferred that the following areas have accident rates significantly higher than that of the turnpike as a whole:

Interchanges	2- 3:	Northbound and Southbound
Interchanges	4- 5:	Southbound
Interchanges	8- 8½:	Southbound
Interchanges	15-16:	Northbound

In addition, some areas have rates lower than the overall rates:

Interchanges	1- 2:	Northbound
Interchanges	7- 7½:	Northbound
Interchanges	16-18:	Southbound

It was concluded that to lower the accident rate most effectively, the highway engineer should concentrate on the areas shown to have high accident rates and incorporate features of those areas with low rates in his study.

A number of other points in Figure 1 are deserving of attention because they lie near the control limits. For example, the southbound rate between interchanges 2 and 3 is almost out of control at the 0.005 limit, but not quite. However, if 0.025 limits were used, this point would have been out of control.

The control chart (Figure 2) shows the differences between southbound and northbound accident rates. Only

. . . three-year accident experience provides reliable data

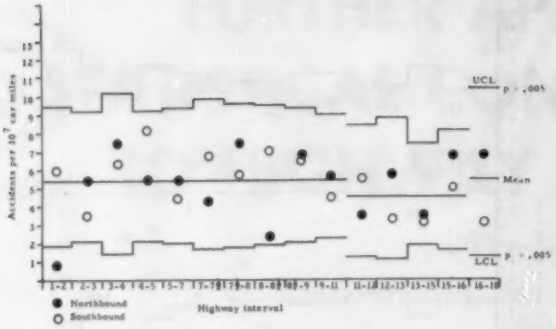

Figure 3. Control chart for accident rates by highway location--1953.

the difference for interchanges 1-2 is out of control, but again, a number of points are near the control limits which would have been out of control had narrow control limits been used. These will be discussed in the next section.

II. Recent Applications

The administrators of the highway system for which the 1952 data were analyzed have recently forwarded comparable data for 1953 and 1954. Only one slight difference exists: the authors divided each of two long stretches of the road in half for purposes of analysis, while the highway administrators divided them near but not at the halfway point. This causes some dissimilarity between the data already analyzed and newer data, but not enough difference to cause any difficulty.

Northbound and Southbound Accident Rates

The control charts for northbound and southbound accident rates for 1953 and 1954 are shown as Figures 3 and 4. The 1953 data disclose only two points out of control, but a number of points are near the control limits. The 1954 data illustrates only one point near the limits but a number are almost out of control. It will be noted that the 1953 and 1954 data show the same general pattern as 1952.

In order to confirm the pattern and the points out of control, the accident experience for the three years was totaled; the control chart for these data is shown in Figure 5. The figure represents a more reliable set of indices than any of the one-year charts. It was indicated earlier

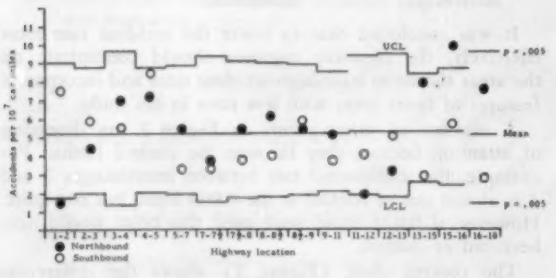

Figure 4. Control chart for accident rates by highway location--1954.

TABLE I.
Comparison of Data from Control Charts

Interval		State of Control 1952	1953	1954	1952-1954
1 - 2	North	out L	out L	out L	out L
	South				near H
2 - 3	North				
	South	near L			
3 - 4	North	out H			out H
	South	out H			out H
4 - 5	North				
	South	out H		near H	out H
5 - 7	North				
	South				
7 - 7½	North	out L			near L
	South				
7½- 8	North				
	South				
8 - 8½	North		near L		
	South	out H			near L
8½- 9	North				
	South				
9 -11	North	near L			
	South				
11 -12	North	near L		near L	out L
	South				
12 -13	North				
	South				
13 -15	North			near H	
	South			near L	out L
15 -16	North	out H	near H	out H	out H
	South				
16 -18	North				
	South	out L			out L

H—High
L—Low
Out—Out of control
Near—Near the control limit

that as the amount of data increases the estimates of the local accident rates tend to converge to the true rates. In addition, the control limits also converge.

The three-year control chart will tend to confirm indications given by the three one-year charts. However, there are some deficiencies in the three-year accumulation: (1) very small differences that have been detected once may not be apparent and, (2) changes in the highway in that longer period may be obscured due to the accumulation. That such year-to-year changes have occurred during the period 1952-54 is apparent from the progressive decreases in yearly accident rate.

From Figure 5, it can be inferred that there are causal systems operating at the ends of the highway which do not operate in the middle. In particular the northbound accident rate is low at location 1-2 and high at locations 15-16 and 16-18. The converse holds for southbound rates. If one can assume that the northbound and southbound sections of the road are identical at any location, it would appear that there is a difference in the behavior

. . . small samples can yield valuable information

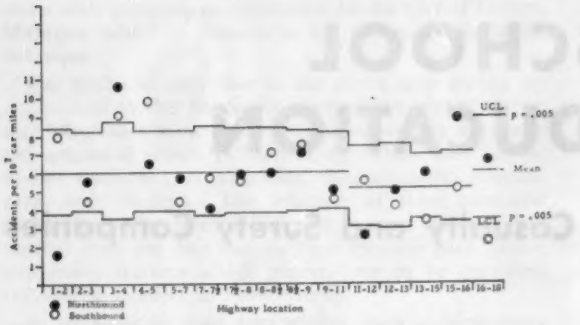

Figure 5. Control chart for accident rates by highway location, 1952, 1953, 1954.

of people who use the two sides of road. Either different people used the two sides or the same people were in different behavioral "states" when they drove on the two sides. This point will be further discussed below.

The control chart also shows other specific areas which have accident rates different from that of the remainder of the roadway:

Northbound, area 3- 4
Southbound, area 3- 4
Southbound, area 4- 5
Northbound, area 11-12 (low rate)

It is suggested that these are the areas to which the highway engineer should pay particular attention.

Table I gives a comparison of the indications yielded by the control charts for each year and the accumulated data for the three years. Only two points out of control in the charts for individual years failed to give out of control indications in the accumulated control chart. And most of the points near the control limits in the one-year charts were out of control in the three-year charts.

Differences in Accident Rates

It is reasonable to expect the accident rates for the northbound side of the highway to be equal to those for the southbound side. The control charts for northbound and southbound rates suggested that this hypothesis was not tenable, and, as Figure 2 indicated, the hypothesis could not be accepted. Figures 6 and 7 present comparable data for the years 1953 and 1954 which confirm the patterns noted in Figure 2.

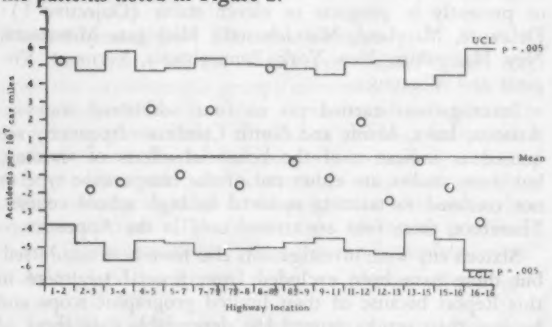

Figure 6. Control chart for Southbound minus Northbound accident rates--1953.

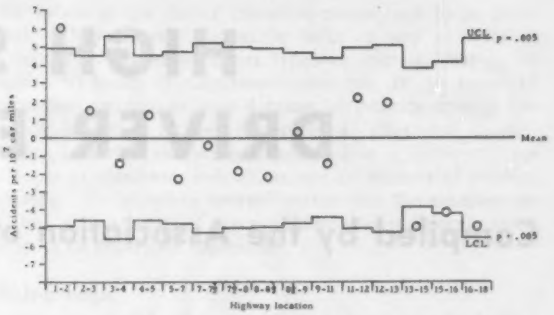

Figure 7. Control chart for Southbound minus Northbound accident rates--1954.

The Figure 8 control chart shows the differences in accident rates for the three years 1952-1954. The terminal effects noted earlier appear again. A comparison of this chart with the last column in Table I indicates that the same locations are out of control as were noted in Figure 5.

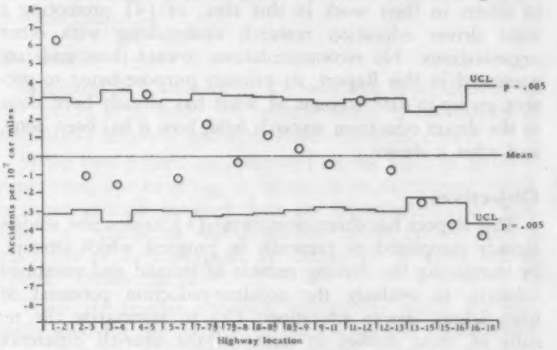

Figure 8. Control chart for Southbound minus Northbound accident rates--1952, 1953, 1954.

III. Conclusions

This study was conducted to investigate further the usefulness of statistical control techniques for identifying excessively high or excessively low risk sections of a highway. In a previous study it was found that the proposed analytical-control technique did permit such areas to be identified positively with the implication that assignable causes could be found and remedial action taken where appropriate.

One test for the validity of the conclusions derived from these statistical procedures is the comparison of the results obtained from a small sample of accident data (say for one year) with those obtained from later data samples. In this study, accordingly, inferences drawn about the distribution of accident risks along a highway on the basis of one-year's observations (1952) were compared with those of later periods (1953 and 1954) as well as those of the entire period (1952-54). These were found to be in substantial agreement. It is concluded that the application of statistical control techniques to highway accident risk analysis can yield valuable and reliable information from relatively small samples and essentially brief periods of observation. THE END

Research on the Accident Reduction Value of - - -

HIGH SCHOOL DRIVER EDUCATION

Compiled by the Association of Casualty and Surety Companies

This Report has been prepared at the direction of the Sub-committee on Driver Education Research, to aid in the further consideration of what position, if any, should be taken by the Accident Prevention Department in regard to the following possibilities: (1) publishing a guide to driver education research; (2) conducting a driver education research study of its own; (3) serving as consultant to others in their work in this area; or (4) promoting a joint driver education research undertaking with other organizations. No recommendations toward these ends are presented in this Report, its primary purpose being to present an up-to-date account of what has already been done in the driver education research field, how it has been done, and what it shows.

Objectives

This Report has three objectives: (1) to describe studies already completed or presently in progress which attempt, by comparing the driving records of trained and untrained subjects, to evaluate the accident-reduction potential of high school driver education; (2) to summarize the results of these studies in terms of the over-all difference which they show in the accident experience of trained and untrained drivers; and (3) to summarize their results in terms of the lasting effect of driver education.

The Report is not specifically concerned with analyzing or evaluating the methods used and controls exercised in these studies. Therefore, no study has been rejected from consideration because of possible limitations in its scientific accuracy and dependability. As will be seen, however, some studies are eliminated for summarization purposes because they do not lend themselves to the simple mechanics of the various analyses made.

In addition, it is impossible in a report such as this to completely avoid commenting on certain questionable features of the studies, and on the general limitations which attend all research of this type. These comments are made as needed.

Synopsis

This is a comprehensive report of the most important work which has been or is being done throughout the country in an effort to measure the accident-reduction value of high school driver education by comparing the records of trained and untrained drivers.

Initial emphasis is placed on the methods and techniques used in eleven state studies. The results of four of these studies are then added together to show an over-all picture. Two of these four studies are further analyzed in terms of the lasting effect of driver education.

On the basis of an analysis of the four state studies, the most conservative observation which can be made about the comparative accident experience of trained and untrained drivers is that the trained appear to have 19 per cent fewer accidents than the untrained. (This statement refers to male subjects only.)

The broadest statement which can be made (and this refers only to female subjects) is that trained drivers appear to have 51 per cent fewer accidents than the untrained.

By "manipulating" the four state studies, the accident experience of trained male subjects can be made to appear as much at 32 per cent better than the untrained; and the accident experience of trained female subjects can be made to appear only 40 per cent better than the untrained.

Trained females appear to have a better accident record than trained males, and untrained females appear to have a better record than untrained males.

While no really definite trend can be shown in the comparative year-to-year accident experience of trained and untrained subjects, considerable leveling off between the two groups appears to occur with the passage of time.

Note: The above observations are made entirely on the basis of the face-value results of four state studies. They prove nothing, and should not be accepted as prima-facie evidence of the accident-reduction value of high school driver education.

Scope

In this Report are described studies already completed or presently in progress in eleven states (Objective 1): Delaware, Maryland, Massachusetts, Michigan, Minnesota, New Hampshire, New York, Pennsylvania, Vermont, Virginia and Wisconsin.

Investigations carried on in four additional states — Arizona, Iowa, Maine and North Carolina—frequently are quoted as indicative of the beneficial effects of training, but these studies are either not of the comparative type or not confined to training received in high school courses. Therefore, these four are treated only in the Appendix.

Sixteen city-wide investigations also have been conducted, but these have been excluded from general treatment in this Report because of their limited geographic scope and because their results proved less dependable than those of the state studies. Descriptions of two of these city studies will be found in the Appendix—the American Automobile Association's oft-quoted investigation in Cleveland, Ohio,

. . . study covers experience in 11 states

and a study presently being planned for the City of Detroit, Michigan, which is noteworthy for the excellence of its technique.

The results of only four of the eleven state studies are summarized in this Report in terms of the over-all difference which they show in the accident experience of trained and untrained drivers (Objective 2). These four are the studies conducted in Delaware, Massachusetts, Pennsylvania and Virginia. The selection of these particular studies for summarization purposes was not arbitrary, but resulted from the fact that they are the only ones having comparable features which permit them to be combined and treated, in effect, as a single study.

In summarizing these four studies, only *accident* experience is presented (collateral data on violations, convictions and arrests having been eliminated for summarization purposes).

Only two of these four studies—Massachusetts and Virginia—attempted to measure the *lasting* effect of driver education.[1] This factor, as shown by these two studies, is analyzed separately (Objective 3).

Definitions

This section is devoted to an explanation of various terms used in this Report.

Comparative Study

This is the type of research generally used in attempting to evaluate the practical effectiveness of high school driver education. In its simplest form, it is a straight mathematical comparison, over a uniform period of time, of the accident experience of a group of licensed subjects who have completed a driver education course (trained), with a group of licensed subjects who have not received such instruction (untrained). The difference in experience is presumed to reflect the degree to which driver education has a real influence on the safe-driving performance of its graduates.

In addition to actual accident experience, the comparison between groups frequently includes violation, conviction or arrest data, on the assumption that these are symptoms of probable accident-involvement in the future and, therefore, indicative of the safe-driving performance of the subjects. This Report concerns itself with accident data.

Experimental and Control Groups

In comparative studies of this type, trained drivers comprise the experimental group; untrained drivers, the control group. More than one experimental group may be used in a given study, as when a definite distinction is made between trained subjects whose training consisted only of driver education classroom instruction and those whose training included actual practice in addition to classroom instruction. The former type of course is referred to as a "classroom course," the latter as a "complete course."

As used in this Report, these two phrases refer only to the nature of the driver education course, not to its duration. They do not necessarily refer in any instance to "standard" courses of either type—to courses, that is, of either 30 hours of classroom instruction, or 30 hours of classroom instruction plus 6 hours of practice driving. A course identified in this Report as a "classroom course" means only that the students enrolled in it received *some* amount of classroom instruction and *no* amount of practice driving. A "complete course" means that the students received some amount of practice driving in addition to some amount of classroom instruction.

Sub-groups

In some studies, the experimental group may be broken down into smaller segments of trained subjects, usually either on the basis of age or school year in which their training was received. The same segmentation also may be true of the control group, in which case either age or year in which the subjects were licensed is used as the differentiating factor. These smaller segments within each of the larger study groups are referred to in this Report as "sub-groups."

Reliability

Reliability is a measure of the scientific dependability of the results of a study. A reliable study is one which is statistically accurate and free from statistical error.

When two groups are compared on the basis of accident experience, for example, a difference in experience which is shown to exist between them can be accepted as a "reliable" or "significant" difference *only when proved statistically not to be the result of chance or of some set of "freak" circumstances.*

There are regular statistical procedures which are normally used for the purpose of computing the reliability of a given study's findings. Of the eleven major studies here treated, however, only two report having used this type of detailed statistical treatment.

Validity

Validity, on the other hand, is a measure of the extent to which a study accomplishes its stated purpose. Validity has to do with cause-and-effect relationships. When a study sets out to measure the effect of a given cause, it must, to be valid, isolate this particular cause and make sure that the effect shown was not produced by other factors. Thus, a valid driver education research study is one which isolates the driver education course as the *sole cause* of the accident reduction effect shown.

While quite outside the practical interest of this analysis, it should be observed here that *lack of validity constitutes the most serious weakness of the typical driver education comparative study.* It is this lack of validity which makes it impossible to accept face-value results of a study as a clear-cut and indisputable indication of the existence of a cause-and-effect relationship between training and superior driving performance.

Validity is the factor being challenged, for example, whenever a comparative study is said to have failed to take into account the "bias effect of driver education's selectivity." By this is meant the entirely plausible possibility that students *electing* to take high school driver education

1. In addition to these two, Vermont also attempted to measure the lasting effect of driver education, and this study is an excellent example of technique. It was omitted, however, because of the incompleteness of its results. A detailed description of the Vermont plan will be found in the Appendix.

. . . no two studies alike in all respects

are a "select" group to begin with—a group of fairly responsible citizens, so to speak, who are so constituted that they would probably turn out to be superior drivers anyway, even though they had never seen the inside of a driver education classroom or sat behind the wheel of a dual-control training car. Those who so challenge a study's validity go on to assume that a large number of students who serve as subjects in control groups are those who did not elect to take driver education, and thus would probably have developed into drivers with questionable records anyway—with or without a driver education course.

Select Group Poses Problems

Since the trained subjects are a "select" group to begin with, therefore, it is impossible to say that driver education is the actual *cause* of their superior driving records, even though such superiority may be exhibited through a comparative study.

To be really valid, therefore, a comparative study must actually *prove* that a course in driver education was the circumstance, and the only circumstance, which *caused* its graduates to have a better record than those not receiving the course. It must prove, in other words, that these driver educated youngsters actually would have had a *poorer* record if they had not received training, and that the untrained would have had better records if they *had* received it. This kind of proof is not offered by the typical comparative study.

As has been pointed out, however, the validity of studies is no more a consideration in this Report than is their reliability, and the foregoing discussion has been presented only as essential background information.

The Eleven State Studies
Pertinent Background Information

This section is devoted to the various procedures and techniques used in the eleven state studies. It discusses in a general fashion the differences in approach used, gives a capsule version of the significant features of each study, and summarizes these features in table form to provide an easy means of comparison.

While certain general similarities exist among the 11 state studies, no two of them are alike in all respects. The most obvious differences among them are in the following areas:

1. Method used in selecting subjects.
2. Male-female composition of the experimental and control groups.
3. The organization and presentation of the accident data reported.

While such differences have little bearing on the relative quality of the studies, they are nevertheless important in this particular report because they make it difficult to combine the studies in order to present a total picture—one of the Report's primary objectives.

The 11 state studies also vary widely in one other important respect, namely, the degree to which good experimental control has been exercised. Minimum control requirements call for a careful matching of the trained with the untrained groups on items such as age, sex, urban vs. rural residence, geographic representation, amount and type of driving exposure, graduation vs. non-graduation from high school, year licensed and type of license held. Although this is by no means a complete list of the essential "matching items," it does give an indication of the many factors which must be considered in conducting "good" driver education research.

In the following description of studies, some mention is made of various control features which are pertinent or interesting.

1. The Delaware Study[1]

Subjects	Trained	Untrained
Male	617	617
Female	476	476
Total	1,093	1,093

Date Training Received: 1947-48, 1948-49 and 1949-50 school years.

Date All Subjects Licensed: 1948, 1949 and 1950.

Years of Accident Experience Surveyed: 1948 through 1952.

Type of Experience Surveyed: (1) both number of accidents in which subjects became involved, and number of accident-involved subjects; (2) both property-damage and personal-injury accidents.

Method of Reporting Experience: accumulated accident experience of subjects during entire period surveyed.

Delaware, being a small state, has a relatively small annual pool of trained subjects to be used in a comparative study. (Although all of the State's 34 secondary schools offer a complete driver education course, only about 1,000 students or 60 per cent of those eligible are trained each year.)

For the purposes of the recent Delaware study, this number of potential subjects was further reduced by fairly strict matching requirements imposed on the experimental and control groups. These groups were matched on the basis of age, sex, urban vs. rural residence, graduation vs. non-graduation from high school, year of licensing and type of license held. No taxi or truck drivers, driver-salesmen or chauffeurs were included in either group.

To maintain these requirements, and at the same time develop reasonably large groups of subjects, Delaware drew its experimental group from among those trained in the 1947-48, 1948-1949 and 1949-50 school years—instead of from only one school year, as was done in some of the other studies. By using this procedure, Delaware obtained an experimental group of about 600 trained males and 500 trained females, which were exceptionally well-matched with equal numbers of untrained males and females. All subjects in both groups had been licensed during the same period of time—1948-1950.

The Delaware study surveyed only the accumulated experience of its trained and untrained subjects during a five-year period, 1948 through 1952. It did not attempt to measure the lasting effect of driver education by analyzing the successive experience of its subjects during *each* year of the survey period.

1. A total of four separate analyses have been made of the accident records of Delaware's trained and untrained drivers. This particular study, the most recent of the four, is by far the best in terms of method and controls exercised. The three earlier investigations are discussed in this Report only in the Appendix.

. . . Vermont and Wisconsin use control groups

Delaware is one of the four studies which will be summarized further on in this Report.

2. The Vermont Study

Subjects	Male and Female[1] Trained	Male and Female[1] Untrained
Sub-group 1 (1948-49)	209	209
Sub-group 2 (1949-50)	306	306
Sub-group 3 (1950-51)	410	410
Sub-group 4 (1951-52)	?	?
Sub-group 5 (1952-53)	?	?

Date Training Received: 1948-49 through 1952-53 school years.

Date All Subjects Licensed: 1949 through 1953.

Years of Accident Experience Surveyed: 1949 through 1953 (latter two years not reported, however).

Type of Experience Surveyed: (1) number of accident-involved subjects; (2) both property-damage and personal-injury accidents.

Method of Reporting Experience: annual accident experience of each sub-group.

Vermont used the same technique as Delaware in selecting its trained subjects from more than one school year's graduates, but used a totally different technique in its organization of data. Delaware, on the one hand, grouped all of its trained subjects into one experimental group and all of its untrained subjects into one control group, and reported only the total accumulated experience of each. Vermont, on the other hand, worked with separate and distinct sub-groups, each representing a sampling of a single year's "crop" of newly licensed trained and untrained drivers, and reported *each separate year's experience for each sub-group.*

Establish Control Groups

The Vermont plan, which started in 1949, was to select each year for study a certain number of 16- and 17-year-old newly licensed trained subjects (trained just prior to licensing) and an equal number of newly licensed untrained subjects of the same age, and to follow up on the annual records of these subjects for a period of at least five years. In this fashion, five different sub-groups of trained and untrained drivers were accumulated from Vermont licensees of 1949 through 1953. A separate survey was made of the annual accident experience of each sub-group.

One of the most interesting aspects of the Vermont study is that its system of sub-groupings within the experimental and control groups permits a greater variety of analyses than do the other comparative studies. In addition, the system contains a number of statistical "checks" on the consistency and the reliability of its results. Best of all, the plan makes it possible to observe whatever degree of leveling off occurs between the experience of trained and untrained subjects with the passage of time.

The incompleteness of results so far published from the Vermont investigation prevents the study from being incorporated into this Report for summarization purposes. The design of the study, however, is a unique example of technique and is particularly well adapted to evaluating the lasting influence of training. For this reason, particular attention is invited to the detailed description of the Vermont plan which appears in the Appendix.

1. Vermont did not survey the accident experience of its male and female subjects separately.

3. The Wisconsin Study[2]

Subjects	Male[3] Classroom Trained	Male[3] Complete Course[4] Trained	Male Untrained
Sub-group 1 (1946-47)	30	30	30
Sub-group 2 (1947-48)	30	30	30
Sub-group 3 (1948-49)	30	30	30
Total	90	90	90

Date Training Received: 1946-47, 1947-48 and 1948-49 school years.

Date All Subjects Licensed: by January 1, 1950.

Years of Accident Experience Surveyed: January 1, 1948 (assumed) through June 30, 1951.

Type of Experience Surveyed: (1) number of accidents in which subjects became involved; (2) both property-damage and personal-injury accidents.

Method of Reporting Experience: accumulated accident experience of each sub-group.

The Wisconsin study used two experimental groups, one composed of students who had received only the State's regular classroom course of instruction, and the other composed of students who also had been enrolled in the State's home instruction plan of practice driving. The trained subjects were selected from among those trained during three school years (1946-47, 1947-48 and 1948-49), and were divided into sub-groups on the basis of school year. Thus, there were three sub-groups for each of the experimental groups (or six sub-groups in all among the trained students). Wisconsin's control group also was divided into three sub-groups, matched with their trained counterparts on the basis of age and year of licensing.

Each of these nine sub-groups was composed of 30 male subjects (female subjects were not included in the Wisconsin study), providing a total study population of 270.

Accident Experience Differs

The accident experience of each subject was surveyed from the date of his licensing through June 30, 1951. Thus while the accident experience of some subjects was surveyed over as long as about a three and one-half year period, the experience of others was surveyed over only about a one and one-half year period.

As can be seen, therefore, the Wisconsin study was similar to both the Delaware and Vermont plans in that it selected its trained subjects from three different driver education classes. In its use of sub-groups, however, it was similar *only* to the Vermont study. Yet it differed from Vermont and followed the Delaware plan in regard to *not* reporting the annual accident experience of its subjects. These shaded differences in method and approach used by these three studies are mentioned only as an illustration of the general lack of comparability which exists widely among all of the eleven state studies being considered.

2. This particular Wisconsin study is one which was completed in 1951 as a Masters of Science Degree thesis at the University of Wisconsin. A previous comparative study also had been conducted in Wisconsin, but available information about this study is very incomplete. The earlier study is discussed only in the Appendix of this Report.
3. No female subjects used.
4. Classroom instruction plus a home-instruction plan of practice driving unique to Wisconsin.

. . . Virginia's students were from 17 to 23 years old

In addition, the Wisconsin study is uniquely difficult to reconcile with the others because of its use of a small-sampling technique in contrast to the broader-sampling basis normally used in a comparative study. For this reason, it is discussed further in this Report only in the Appendix.

A "DILUTED" STUDY

4. The Virginia Study

Subjects	Trained	Untrained
Male	384	435
Female	337	230
Total	711	665

Date Training Received: 1948-49 school year

Date All Subjects Licensed: by January 1, 1950

Years of Accident Experience Surveyed: 1950 through 1953

Type of Experience Surveyed: (1) number of accidents in which subjects became involved; (2) both property-damage and personal-injury accidents.

Method of Reporting Experience: annual as well as accumulated accident experience of subjects.

In contrast to the three foregoing studies, the Virginia investigation was limited to experimental subjects trained during one school year only (1948-49). All of the subjects, as well as those selected for the control group, had become licensed on or before January 1, 1950.

Virginia's driver education courses vary widely: from "standard" courses of 30 hours of classroom instruction both with and without the additional 6 hours of practice driving time, to courses of as low as 18 hours. Since the Virginia study permitted subjects into its experimental group if they had received as little as 18 hours of classroom instruction (without practice driving), this experimental group can be assumed to be a fairly "diluted" one —that is, representative of various quality levels of instruction.

The Virginia accident experience survey covered the four-year period 1950 through 1953, and each calendar year of experience was reported separately. In this latter respect, it can be seen that the Virginia investigation operated on a basis similar to the Vermont study, with the exception that its subjects were limited to just one year's "crop" of trained and untrained drivers, rather than including several as did Vermont.

Subjects in both groups used in the Virginia study ranged from about 17 to 23 years of age—a good matching arrangement. Considerable variation existed between the two groups, however, in regard to probable urban vs. rural driving exposure, with a considerably larger proportion of the untrained subjects having been drawn from schools in smaller cities and towns. (When the technique is used of selecting untrained subjects from schools not offering driver education, it becomes particularly important to make sure that both groups are geographically representative of the state in equal proportions. In some studies, this matching problem is avoided by selecting the untrained subjects from the same schools used in selecting the trained. This latter technique is good for handling the geography of a study, but it has the disadvantage of aggravating the factor of course-selectivity which was previously discussed in this Report in connection with the validity of comparative studies in general.)

In any case, the selection process used in the Virginia study resulted in unequal geographic representation between the two groups, with 68 per cent of the untrained being drawn from schools in the "Remainder of State" automobile liability statistical territory compared with only 11 per cent of the trained.

Nevertheless, Virginia is one of the few published studies which permit observations on the permanence of the effect of driver education. It is also the only one of the 11 studies treated in this Report whose face-value results do not show trained drivers to have a better record than the untrained.

Virginia is one of the four studies which will be summarized further on in this Report.

"A FIVE-YEAR PLAN"

5. The Minnesota Study

Subjects	Male and Female[1] Classroom Trained	Male and Female[1] Complete Course Trained	Male and Female[1] Untrained
Total	1,000	1,000	1,000

Date Training Received: apparently 1948-49 school year.

Date All Subjects Licensed: by January 1, 1950.

Years of Accident Experience Surveyed: projected for 1950 through 1954 (1954 not yet reported).

Type of Experience Surveyed: annual accident experience of subjects.[2]

Minnesota followed essentially the same plan used in Virginia in that it selected its trained subjects from only one school year's course graduates (apparently 1948-49), and attempted to measure the lasting effect of driver education by surveying the accident experience of its subjects on an annual basis.[2] As Wisconsin did, however, Minnesota used two experimental groups—one of classroom-only graduates and one of complete course graduates.

The Minnesota study was projected in 1950 as a five-year plan, with only partial results released to date. Additional details about this study will be found in the Appendix.

1. Minnesota did not survey the accident experience of its male and female subjects separately.

2. Ostensibly so reported. However, the figures strongly appear to be cumulative from the beginning of the period covered by the survey, a question which undoubtedly will be cleared up when the final figures of the Minnesota study are released

. . . Massachusetts reports ten-year study

MORE FEMALES TRAINED

6. The Pennsylvania Study

Subjects	Trained	Untrained
Male	589	1,096
Female	911	404
Total	1,500[1]	1,500[1]

Date Training Received: 1949-50 school year.

Date All Subjects Licensed: during 1950.

Years of Accident Experience Surveyed: Mid-1950 (assumed) through 1952.

Type of Experience Surveyed: (1) number of accidents in which subjects became involved; (2) both property-damage and personal-injury accidents.

Method of Reporting Experience: accumulated accident experience of subjects during entire period surveyed.

The Pennsylvania investigation is similar to the Virginia and Minnesota studies in that its 1,500 trained subjects were drawn from only a single year's "crop" of driver education graduates. This was a relatively easy technique for Pennsylvania to follow since, in contrast to Delaware for example, it trained close to 23,000 youngsters during the school year from which its experimental group was drown (1949-50).

The accident experience survey made in Pennsylvania covered a probable period of approximately 2½ years—from some time in 1950 (as the subjects became licensed) through 1952. This study reported only the total accumulated experience of the two groups during the entire period surveyed.

Pennsylvania is one of the four studies which will be summarized further on in this Report.

BALANCE IN MASS. GROUP

7. The Massachusetts Study

Subjects	Classroom Trained	Complete Course Trained	Untrained
Male	400	400	400
Female	100	100	100
Total	500	500	500

Date Training Received: 1948-49 school year.

Date All Subjects Licensed: by January 1, 1950.

Years of Accident Experience Surveyed: projected for 1950 through 1959.

Type of Experience Surveyed: (1) both number of accidents in which subjects became involved, and number of accident-involved subjects; (2) only personal-injury accidents.

Method of Reporting Experience[2]*:* accumulated accident experience of subjects, reported periodically (first report issued after 31 months).

The Massachusetts investigation was projected in 1950 as a ten-year continuing study. Like Minnesota, it used two experimental groups—the classroom-only graduates and the complete course graduates. And like the Virginia, Pennsylvania and Minnesota investigations, it drew its experimental subjects from among students trained during a single school year.

Massachusetts appears to have matched its experimental and control groups by age, geographic representation and urban-rural residence. Just as Delaware did later, it balanced out the male-female composition of its groups by using the same number of each sex in each group—400 males and 100 females respectively, or a total study population of 1,500 subjects.

PERSONAL INJURY ONLY

As the State of Massachusetts does not include property damage accidents in its official Registry of Motor Vehicle reports, the Massachusetts driver education research study was based only on personal-injury accidents. (This is the only study which was so limited.)

The Massachusetts plan was to report periodically on the accumulated experience of its subjects. At the end of the first 31 months, such a report was issued.

As a special courtesy to the Accident Prevention Department for the preparation of this Report, however, Massachusetts ran off a separate year-by-year analysis of the experience of its *complete course experimental group* (omitting the classroom-only experimental group) and its control group. This analysis covered four full years, 1950-53, and the first eight months of 1954. It is this specially-run analysis which is used for summarization purposes in this Report. (Massachusetts' earlier 31-month report is included in the Appendix.) This analysis permits the Massachusetts investigation to be used in making observations about the permanence of the effect of driver education—Virginia being the only other study whose published results can be used for the same purpose.

FOUR STATES LACK DATA

Maryland, Michigan, New Hampshire and New York

The remaining four studies (Maryland, Michigan, New Hampsire and New York) utilized to a greater or lesser degree some of the characteristic methods of studies already described. Lack of definite information about many aspects of these studies, however, prevents their being treated in this Report other than in the Appendix.

1. It should be noted that while Pennsylvania surveyed equal numbers of trained and untrained subjects, its male-female ratio of trained subjects was completely reversed in its selection of untrained subjects.

2. For the particular purpose of this Report, Massachusetts made a special breakdown of its data on an annual basis through August 31, 1954. This breakdown did not include the classroom-only trained group.

. . . varying approaches to the same problem

Summary of Procedures and Techniques Used

To readily show how the 11 state studies differ in their respective methods and approaches to the problem, the foregoing descriptive material is summarized in TABLES I, II-a, b and c, III and IV.

Table I

Male-Female Composition of Experimental and Control Groups and Total Number of Subjects Used in the Eleven State Studies

State	TRAINED			UNTRAINED		
	Male	Female	Total	Male	Female	Total
Maryland	194	104	298	199	49	248
Michigan	273	253	526	374	104	478
New York	279	187	466	472	223	695
Virginia	384	337	711	435	230	665
Pennsylvania	589	911	1500	1096	404	1500
Delaware	617	476	1093	617	476	1093
Massachusetts	800	200	1000	400	100	500
Minnesota	?	?	1000	?	?	1000
New Hampshire	?	?	1270	?	?	1270
Vermont	?	?	925[1]	?	?	925[1]
Wisconsin	180	——	180	90	——	90

It should be observed from Table I, just as a matter of passing interest, that a difference exists among the studies in regard to the numerical balancing of the groups: in the studies conducted in Maryland, Michigan, New York and Virginia, no effort was made either to use the same number of male and female subjects in each group or to use total groups which were numerically equal; the Pennsylvania study did not use an equal number of male and female subjects in each group either, but the totals of each group were the same; the Wisconsin study eliminated female subjects entirely; and only two studies—Delaware and Massahcusetts—balanced out the sex factor of their total groups by using the same number of male and female subjects in each. This latter system has the obvious advantage of permitting a comparison between total groups (instead of male and female components of each group separately) with some assurance that the comparison of trained and untrained subjects is not being biased by too few or too many female drivers in one group or the other.

Table II-a

Length and Type of Accident Experience Surveys Made in Four States in Which the Experimental Groups Were Selected from Only One School Year's Driver Education Course Graduates

State	Years of Experience Surveyed	Annual Experience Reported	Total Accumulated Experience Reported
Virginia	5	Yes	Yes
Massachusetts	4⅔	Yes	Yes
Pennsylvania	2½	No	Yes
Minnesota	4	Yes[2]	Yes[2]

1. 1948-49, 1949-50 and 1950-51 Sub-groups only. 1951-52 and 1952-53 Sub-groups not reported.
2. Questionable.

Table II-b

Length and Type of Accident Experience Surveys Made in Four States in Which the Experimental Groups Were Selected from More Than One School Year's Driver Education Course Graduates

State	Years of[3] Experience Surveyed	Each Sub-Group's Annual Experience Reported	Each Sub-Group's Total Accumulated Experience Reported	No Use Made of Sub-Groups and Only Total Experience Reported
Vermont	Max. 3— Min. 1	Yes	Yes	
Wisconsin	Max. 3½— Min. 1½	No	Yes	
Delaware	Max. 5— Min. 3	——	——	Yes
Maryland	Not Known	——	——	Yes

Table II-c

Length and Type of Accident Experience Surveys Made in Three States in Which the Method of Selecting the Experimental Groups Is Not Known

State	Years of Experience Surveyed	Annual Experience Reported	Total Accumulated Experience Reported
Michigan	Not Known	No	Yes
New Hampshire	Not Known	No	Yes
New York	Not Known	No	Yes

Table III

Type of Accident Data Reported in the Eleven State Studies

State	Number of Accidents Accumulated	Number of Accident-Involved Individuals
Michigan	X	
New York	X	
Pennsylvania	X	
Virginia	X	
Wisconsin	X	
Maryland		X
Minnesota		X
New Hampshire		X
Vermont		X
Delaware	X	X
Massachusetts	X	X

3. Note that a maximum and a minimum time is recorded for each state study. This is because not all of the subjects in the groups used in these studies can be assumed to have been licensed during the entire period of the accident-experience survey. In the case of the Delaware study, for example, experimental subjects were drawn from the driver education course graduates of the 1947-48, 1948-49 and 1949-50 school years, with the experience of these subjects surveyed over the five-year period, 1948 through 1952. In this case, therefore, it can only be assumed that one-third of the group represents the maximum of five years of licensed driving experience, one-third represents four years, and one-third represents only the minimum of three years. This same type of assumption must also be made in regard to the other studies recorded in TABLE II-b.

. . . find four comparable state studies

Table IV

Experimental Groups in the Eleven State Studies Classified According to Type of Driver Education Course Received

State	"Diluted" Group (includes both classroom only and complete course graduates)	"Pure" Group (includes only complete course graduates)	Two "Pure" Groups (two distinct experimental groups: one classroom only, the other, complete course)
Maryland	X		
Michigan	X		
New Hampshire	X		
New York	X		
Vermont	X		
Virginia	X		
Delaware		X	
Pennsylvania		X	
Massachusetts			X
Minnesota			X
Wisconsin			X

Selection of Studies for Statistical Summarization

This section outlines the criteria used in selecting the Delaware, Massachusetts, Pennsylvania and Virginia studies for summarization, explains why the other seven studies are not suitable for this purpose, and itemizes important similarities and differences among the four selected.

Summarizing the results of studies in terms of the overall difference which they show in the accident experience of trained and untrained drivers requires that they be combined and treated, in effect, as a single study. To be so combined, studies must possess comparable features—certain common denominators, so to speak. These features, which serve as criteria in selecting studies for summarization, are as follows:

1. Studies must report the numbers of male and female subjects used in their experimental and control groups, and must report the accident experience of male and female subjects separately.
2. Studies must report (or provide a reasonable basis for assuming) the period of time covered by their accident-experience surveys.
3. Studies must report (or provide a reasonable basis for assuming) the time at which their trained and untrained subjects had become licensed.
4. As a means of determining whether all subjects were licensed during the whole of the survey period or, if not, during what proportion of it, studies must report the school years in which the experimental groups received their training.
5. Studies must report the same type of accident data—that is, either number of accidents accumulated by the groups during the period surveyed, or the number of accident-involved subjects.
6. To be used for the purpose of making observations about the lasting effect of driver education, studies must report the annual experience of the subjects rather than only their total accumulated experience during the entire period of the survey.

Another type of information, while not essential in selecting studies for summarization, is useful. This is the type of driver education course received by the trained subjects —whether a classroom or a complete course. The usefulness of this information lies in the fact that it permits an identification of the "upper-cut" of driver educated youngsters (i.e., those who received the complete course).

Reference back to TABLES I through III on the basis of the aforementioned criteria will show that, of the 11 state studies only four are suitable for summarization—Delaware, Massachusetts, Pennsylvania and Virginia; and only two of these—Massachusetts and Virginia—permit observations about the lasting effect of driver education. The other seven studies are unsuitable for the following reasons:

Maryland — lack of information about the period of time covered by its survey

Michigan — lack of information about the period of time covered by its survey, and about the method of selecting its experimental group

Minnesota — lack of information about the male-female composition of its groups, and the possibility of its reported experience figures being cumulative

New Hampshire — lack of information about the male-female composition of its groups, about the period of time covered by its experience survey, and about the method of selecting its experimental group

New York — lack of information about the period of time covered by its experience survey, and about the method of seeking its experimental group

Vermont — lack of information about the male-female composition of its groups, and the incompleteness of results published to date.

Wisconsin — the incompatibility of its small-sampling technique with the broader-sampling basis used in the other studies

Summary of Studies Selected

Important similarities and differences among the studies conducted in the states of Delaware, Massachusetts, Pennsylvania and Virginia are as follows:

1. All four studies permit a separate analysis of the accident experience of male and female subjects.
2. The Massachusetts, Pennsylvania and Virginia studies exhibit the common characteristic of having selected their experimental groups from only one school year's driver education course graduates. This simplifies the matter of calculating the total number of driver years[1] represented by these studies, since each subject in both the experimental and control groups can be assumed to have been licensed during the entire period of the survey—four years in the case of Virginia, four years and eight months in Massachusetts, and two and one-half years in Pennsylvania.
3. Unlike these three states, however; the Delaware study drew its experimental groups from three school years' driver education course graduates (reporting only their total accumulated experience during the five-year period surveyed). The problem of calculating the total number

1. In this Report, accident rates for the trained and untrained groups are calculated on the basis of number of accidents per 1,000 driver years (number of subjects in a group X number of years covered by their experience survey). This factor of 1,000 driver years is used in calculating accident rates in the same way that the factor of 100,000,000 vehicle miles is used in calculating the national traffic accident death rate. Some such common denominator is obviously necessary when totaling the accident data of four studies which utilized different numbers of subjects and surveyed different periods of time.

. . . trained women drivers better than trained men

of driver years represented by the Delaware study is handled by assuming that one-third of each of the groups represents five, four and three years of licensed driving time, respectively.

4. Virginia and Massachusetts are the only two studies which report the accident experience of their subjects on an annual basis—a feature essential if the permanence of the effect of the driver education is to be observed.
5. All four of the studies use the number of accidents accumulated by their groups as the basis of comparison, with only Delaware and Massachusetts also reporting the number of accident-involved subjects. The summarizations made in the following section of this Report, therefore, are based entirely on the total accidents accumulated—not on accident-involved individuals.
6. The experimental groups used in the Delaware, Massachusetts and Pennsylvania studies were graduates of complete courses. This circumstance makes it desirable to run a separate analysis of these three states alone since the complete course experimental groups involved can be assumed to represent an "upper-cut" of driver education trainees.

The Comparative Experience of Trained and Untrained Drivers

Summary of Results

This section summarizes the results of the Delaware, Massachusetts, Pennsylvania and Virginia studies in terms of the over-all difference which they show in the accident experience of trained and untrained drivers.

The combined results of the four studies selected for summarization are shown in TABLES V through VIII (for male subjects) and IX through XII (for female subjects).

The first of each of the four tables on male and female subjects combines the data of all four studies. The second of each set of four tables combines the data of just the Delaware, Massachusetts and Pennsylvania studies in order to determine whether isolating the graduates of complete driver education courses (Virginia used a "diluted" trained group) has an influence on the difference in experience shown between trained and untrained subjects. The third table of each set combines the data of just the Delaware, Pennsylvania and Virginia studies in order to determine whether the reporting of all types of accidents (Massachusetts reported only personal-injury accidents) has an influence on the difference in experience shown between trained and untrained drivers. And the fourth table of each set carries this refinement process one step further by combining the data of just the Delaware and Pennsylvania studies—the two which used only graduates of complete courses in their experimental groups and also reported both property-damage and personal-injury accidents in their experience surveys.

The difference in the accident experience of trained and untrained drivers shown by each state study individually as well as on a combined basis is shown in each table's Summary of Results. These differences are based on the accident experience of the trained groups per 1,000 driver years, and are recorded as the percentage which this experience is above or below the experience of the untrained group. For the sake of convenience, all percentages have been rounded off.

The following observations can be made:

MEN NEED TRAINING . . .

Observations: Male Subjects

1. Depending on the combination of studies used, the accident experience of trained male drivers can be demonstrated to be from 19 per cent to 32 per cent better than the untrained.
2. When only those three studies are combined whose experimental groups were composed of graduates of complete courses (TABLE VI), maximum difference appears between the experience of the trained and untrained, with the complete course graduates having 32 per cent fewer accidents than their untrained counterparts.
3. It appears to make no difference in the comparative experience of *complete course* trained subjects and their untrained counterparts when the one study which included only personal-injury accidents in its survey (Massachusetts) is eliminated. As shown in TABLE VIII, complete course graduates in the Delaware and Pennsylvania studies also had 32 per cent fewer accidents than the untrained.
4. It does make a difference in the comparative experience of trained and untrained drivers, however, when the results of all four state studies are combined (which means a "dilution" of the trained group with subjects who received minimum driver education instruction). As shown in TABLE V, the combined results of the four state studies show the record of trained male drivers to be only 22 per cent better than that of the untrained.
5. The margin of difference in favor of the "diluted" group of male trained drivers is reduced even further when the one state not reporting property-damage accidents in its survey (Massachusetts) is eliminated. As shown in TABLE VII, trained male subjects in the Delaware, Pennsylvania and Virginia studies had only 19 per cent fewer accidents than their untrained counterparts.

. . . WOMEN NEED IT MORE

Observations: Female Subjects

1. In general, there is a greater margin of difference between the experience of trained and untrained females than there is between the experience of trained and untrained males. For females, various combinations of the four state studies show the trained females to have from 40 per cent to 51 per cent fewer accidents than the untrained.
2. When only those three studies are combined whose experimental groups were composed of graduates of complete courses (TABLE X), the trained female subjects are demonstrated to have 45 per cent fewer accidents than the untrained.
3. This margin of difference in favor of female graduates of complete courses is increased, however, when the one study which included only personal-injury accidents in its survey (Massachusetts) is eliminated. As shown in TABLE XII, complete course female graduates in the Delaware and Pennsylvania studies had 51 per cent fewer accidents than their untrained counterparts.
4. When the results of all four state studies are combined (which means a "dilution" of the trained group with subjects who received minimum driver education instruction), the experience of trained female subjects is shown to be only 40 per cent better than that of the untrained (TABLE IX).
5. But when the one state not reporting property-damage accidents in its survey (Massachusetts) is eliminated, this margin of difference in favor of the "diluted" group of female subjects is increased. As shown in TABLE XI, trained female subjects in the Delaware, Pennsylvania and Virginia studies had 45 per cent fewer accidents than their untrained counterparts.
6. In all cases, trained females have a better record than trained males, and untrained females have a better record than untrained males.

. . . "trained men 19 to 32 per cent better than untrained."

COMPARING MEN IN FOUR STATES

Table V
Summary of Data, Four State Studies
(Male Subjects Only)

Trained

State	No. of Subjects	Years Surveyed	Total Driver Years	No. of Accidents	Accidents Per 1000 Driver Years
Pa.	589	2½	1473	26	18
Va.	384	4	1536	106	69
Mass.	400	4⅔	1867	39	21
Del.	617	3–5	2472	173	70
Totals	1990		7348	344	47

Untrained

State	No. of Subjects	Years Surveyed	Total Driver Years	No. of Accidents	Accidents Per 1000 Driver Years
Pa.	1096	2½	2740	109	40
Va.	435	4	1740	101	58
Mass.	400	4⅔	1867	45	24
Del.	617	3–5	2472	273	110
Totals	2548		8819	528	60

Summary of Results

Percentage Difference in the Experience of Trained Drivers Compared with Untrained Drivers Based on Accidents per 1,000 Driver Years

State	Difference, Trained Compared with Untrained
Pennsylvania	—55%
Virginia	+19%
Massachusetts	—13%
Delaware	—36%
Total	—22%

DRIVING GRADUATES

Table VI
Summary of Data, Three State Studies in Which Experimental Groups Had Received Complete Driver Education Courses
(Male Subjects Only)

Trained

State	No. of Subjects	Years Surveyed	Total Driver Years	No. of Accidents	Accidents Per 1000 Driver Years
Pa.	589	2½	1473	26	18
Mass.	400	4⅔	1867	39	21
Del	617	3–5	2472	173	70
Totals	1606		5812	238	41

Untrained

State	No. of Subjects	Years Surveyed	Total Driver Years	No. of Accidents	Accidents Per 1000 Driver Years
Pa.	1096	2½	2740	109	40
Mass.	400	4⅔	1867	45	24
Del.	617	3–5	2472	273	110
Totals	2113		7079	427	60

Summary of Results

Percentage Difference in the Experience of Trained Drivers Compared with Untrained Drivers Based on Accidents per 1,000 Driver Years

State	Difference, Trained Compared with Untrained
Pennsylvania	—55%
Massachusetts	—13%
Delaware	—36%
Total	—32%

PROPERTY DAMAGE . . . . . BODILY DAMAGE

Table VII
Summary of Data, Three State Studies Based on Property Damage as Well as Bodily-Injury Accidents
(Male Subjects Only)

Trained

State	No. of Subjects	Years Surveyed	Total Driver Years	No. of Accidents	Accidents Per 1000 Driver Years
Pa.	589	2½	1473	26	18
Va.	384	4	1536	106	69
Del.	617	3–5	2472	173	70
Totals	1590		5481	305	56

Untrained

State	No. of Subjects	Years Surveyed	Total Driver Years	No. of Accidents	Accidents Per 1000 Driver Years
Pa.	1096	2½	2740	109	40
Va.	435	4	1740	101	58
Del.	617	3–5	2472	273	110
Totals	2148		6952	483	69

Summary of Results

Percentage Difference in the Experience of Trained Drivers Compared with Untrained Drivers Based on Accidents per 1,000 Driver Years

State	Difference, Trained Compared with Untrained
Pennsylvania	—55%
Virginia	+19%
Delaware	—36%
Total	—19%

. . . with or without training - - - women best drivers

Table VIII

Summary of Data, Two State Studies in Which Experimental Groups Had Received Complete Courses and Which Were Based on Property Damage as Well as Bodily-Injury Accidents
(Male Subjects Only)

Trained

State	No. of Subjects	Years Surveyed	Total Driver Years	No. of Accidents	Accidents Per 1000 Driver Years
Pa.	589	2½	1473	26	18
Del.	617	3–5	2472	173	70
Totals	1206		3945	199	50

Untrained

State	No. of Subjects	Years Surveyed	Total Driver Years	No. of Accidents	Accidents Per 1000 Driver Years
Pa.	1096	2½	2740	109	40
Del.	617	3–5	2472	273	110
Totals	1713		5212	382	73

Summary of Results

Percentage Difference in the Experience of Trained Drivers Compared with Untrained Drivers Based on Accidents per 1,000 Driver Years

State	Difference, Trained Compared with Untrained
Pennsylvania	—55%
Delaware	—30%
Total	—32%

AND NOW THE WOMEN . . .

Table IX

Summary of Data, Four State Studies
(Female Subjects Only)

Trained

State	No. of Subjects	Years Surveyed	Total Driver Years	No. of Accidents	Accidents Per 1000 Driver Years
Pa.	911	2½	2278	15	6.6
Va.	337	4	1348	12	8.9
Mass.	100	4⅔	467	4	8.6
Del.	476	3–5	2008	27	13.5
Totals	1824		6101	58	9.5

Untrained

State	No. of Subjects	Years Surveyed	Total Driver Years	No. of Accidents	Accidents Per 1000 Driver Years
Pa.	404	2½	1010	12	11.9
Va.	230	4	1020	10	9.8
Mass.	100	4⅔	467	1	2.1
Del.	476	3–5	2008	48	24.0
Totals	1210		4505	71	15.8

Summary of Results

Percentage Difference in the Experience of Trained Drivers Compared with Untrained Drivers Based on Accidents per 1,000 Driver Years

State	Difference, Trained Compared with Untrained
Pennsylvania	—45%
Virginia	— 9%
Massachusetts	+309%
Delaware	—44%
Total	—40%

Table X

Summary of Data, Three State Studies in Which Experimental Groups Had Received Complete Driver Education Courses
(Female Subjects Only)

Trained

State	No. of Subjects	Years Surveyed	Total Driver Years	No. of Accidents	Accidents Per 1000 Driver Years
Pa.	911	2½	2278	15	6.6
Mass.	100	4⅔	467	4	8.6
Del.	476	3–5	2008	27	13.5
Totals	1487		4753	46	9.7

Untrained

State	No. of Subjects	Years Surveyed	Total Driver Years	No. of Accidents	Accidents Per 1000 Driver Years
Pa.	404	4½	1010	12	11.9
Mass.	100	4⅔	467	1	2.1
Del.	476	3–5	2008	48	24.0
Totals	980		3485	61	17.5

Summary of Results

Percentage Difference in the Experience of Trained Drivers Compared with Untrained Drivers Based on Accidents per 1,000 Driver Years

State	Difference, Trained Compared with Untrained
Pennsylvania	—45%
Massachusetts	+309%
Delaware	—44%
Total	—45%

Table XI

Summary of Data, Three State Studies Based on Property Damage as Well as Bodily-Injury Accidents
(Female Subjects Only)

Trained

State	No. of Subjects	Years Surveyed	Total Driver Years	No. of Accidents	Accidents Per 1000 Driver Years
Pa.	911	2½	2278	15	6.6
Va.	337	4	1348	12	8.9
Del.	476	3–5	2008	27	13.5
Totals	1724		5634	54	9.6

. . . driver training pays long-term dividends

Table XI—cont.

Untrained

State	No. of Subjects	Years Surveyed	Total Driver Years	No. of Accidents	Accidents Per 1000 Driver Years
Pa.	404	2½	1010	12	11.9
Va.	230	4	1020	10	9.8
Del.	476	3–5	2008	48	24.0
Totals	1110		4038	70	17.3

Summary of Results

Percentage Difference in the Experience of Trained Drivers Compared with Untrained Drivers Based on Accidents per 1,000 Driver Years

State	Difference, Trained Compared with Untrained
Pennsylvania	—45%
Virginia	— 9%
Delaware	—44%
Total	—45%

A PLUG FOR WOMEN DRIVERS

Table XII

Summary of Data, Two State Studies in Which Experimental Groups Had Received Complete Courses and Which Were Based on Property Damage as Well as Bodily-Injury Accidents

(Female Subjects Only)

Trained

State	No. of Subjects	Years Surveyed	Total Driver Years	No. of Accidents	Accidents Per 1000 Driver Years
Pa.	911	2½	2278	15	6.6
Del.	476	3–5	2008	27	13.5
Totals	1387		4286	42	9.8

Untrained

State	No. of Subjects	Years Surveyed	Total Driver Years	No. of Accidents	Accidents Per 1000 Driver Years
Pa.	404	2½	1010	12	11.9
Del.	476	3–5	2008	48	24.0
Totals	880		3018	60	19.9

Summary of Results

Percentage Difference in the Experience of Trained Drivers Compared with Untrained Drivers Based on Accidents per 1,000 Driver Years

State	Difference, Trained Compared with Untrained
Pennsylvania	—45%
Delaware	—44%
Total	—51%

The Lasting Effect of Driver Education

Summary of Results

This section summarizes the results of the Massachusetts and Virginia studies in terms of the difference which they show in the year-to-year experience of trained and untrained subjects—an indication of the lasting effect of driver education.

The combined results of the Massachusetts and Virginia studies are shown on a yearly basis in Tables XIII and XIII-a (for male subjects), and Tables XVI and XVI-a (for female subjects). Table XIV, XIV-a, XVII and XVII-a are devoted to the Massachusetts study alone, and Tables XV, XV-a, XVIII and XVIII-a to the Virginia study alone.

As in the preceding section, accident rates for the trained and untrained groups have been calculated on the basis of accidents per 1,000 driver years. These rates are shown in the tables for each single year of a total four-year survey period, and on a yearly cumulative basis. The differences between the groups are shown not as percentage differences (as in the previous section), but as actual numerical differences based on accidents per 1,000 driver years.

The following observations are based on the combined results of the Massachusetts and Virginia studies.

Observations: Male Subjects

1. Trained male subjects finished their first year of driving with 11 fewer accidents per 1,000 driver years than the untrained (#2, Table XIII-a).
2. But during the second year, the untrained males reduced their experience considerably more than did the trained (#1, Table XIII-a), with the result that, during the second year, trained male drivers had 19 *more* accidents per 1,000 driver years than the untrained (#2, Table XIII-a).
3. Both groups *increased* their experience in the third year of driving, the untrained more than the trained (#1, Table XIII-a). Nevertheless, trained male drivers during their third year, had an experience of 13 *more* accidents per 1,000 driver years than the untrained (#2, Table XIII-a).
4. Trained male drivers reduced their experience by the greatest margin during their fourth year of driving—by 21 accidents per 1,000 driver years compared with a reduction of only 2 in the experience of the untrained (#1, Table XIII-a). During their fourth year, trained drivers had 6 fewer accidents per 1,000 driver years than the untrained (#2, Table XIII-a).
5. In their fourth year of driving compared with their first, trained male drivers showed a reduction of 25 accidents per 1,000 driver years, while the untrained reduced their experience by 30 (#1, Table XIII-a).
6. On a cumulative basis, the experience of the trained male group was better than that of the untrained only during the first year of driving. Thereafter, the experience of the trained stayed consistently, even though only slightly, higher than that of the untrained as additional years of driving were accumulated (#3, Table XIII-a).
7. While no really definite trends can be established in the comparative year-to-year experience of trained and untrained male subjects, considerable leveling off between the experience of the two appears to occur with the passage of time (#3, Table XIII-a).

. . . training shows up in lowered accident rate

Table XIII

Massachusetts and Virginia

The Accident Experience of Trained and Untrained Subjects in Massachusetts and Virginia (Combined) on a Yearly and Cumulative Basis for Four Years
(Male Subjects Only)

Trained

Year of Experience	No. of Subjects	Total Driver Years		No. of Accidents		Accidents Per 1000 Driver Years	
		By Year	Cumulative	By Year	Cumulative	By Year	Cumulative
First	784	784	784	42	42	54	54
Second	784	784	1,568	38	80	49	51
Third	784	784	2,352	39	119	50	51
Fourth	784	784	3,136	23	142	29	45

Untrained

Year of Experience	No. of Subjects	Total Driver Years		No. of Accidents		Accidents Per 1000 Driver Years	
		By Year	Cumulative	By Year	Cumulative	By Year	Cumulative
First	835	835	835	54	54	65	65
Second	835	835	1,670	25	79	30	47
Third	835	835	2,505	31	110	37	44
Fourth	835	835	3,340	29	139	35	42

Table XIII-a

Massachusetts and Virginia

Summary of the Massachusetts and Virginia Results (Combined) on a Yearly and Cumulative Basis
(Male Subjects Only)

1. Yearly Changes in Accident Experience Per 1,000 Driver Years, Trained and Untrained Subjects

	First Year's Rate	Change, Second Over First Year	Change, Third Over Second Year	Change, Fourth Over Third Year	Fourth Year's Rate	Change, Fourth Over First Year
Trained	54	— 5	+1	—21	29	—25
Untrained	65	—35	+7	— 2	35	—30

2. Differences in Yearly Experience, Trained Subjects Compared with Untrained Subjects

First Year	Second Year	Third Year	Fourth Year
—11	+19	+13	—6

3. Differences in Cumulative Experience, Trained Subjects Compared with Untrained Subjects

First Year	First Two Years	First Three Years	All Four Years
—11	+4	+7	+3

Note leveling off with passage of time in XIIIa

Table XIV

Massachusetts

The Accident Experience of Trained and Untrained Subjects in Massachusetts on a Yearly and Cumulative Basis for Four Years
(Male Subjects Only)

Trained

Year of Experience	No. of Subjects	Total Driver Years		No. of Accidents		Accidents Per 1000 Driver Years	
		By Year	Cumulative	By Year	Cumulative	By Year	Cumulative
First	400	400	400	11	11	28	28
Second	400	400	800	9	20	23	25
Third	400	400	1,200	10	30	25	25
Fourth	400	400	1,600	6	36	15	9

Untrained

Year of Experience	No. of Subjects	Total Driver Years		No. of Accidents		Accidents Per 1000 Driver Years	
		By Year	Cumulative	By Year	Cumulative	By Year	Cumulative
First	400	400	400	14	14	35	35
Second	400	400	800	8	22	20	28
Third	400	400	1,200	8	30	20	17
Fourth	400	400	1,600	8	38	20	13

Table XIV-a

Massachusetts

Summary of the Massachusetts Results on a Yearly and Cumulative Basis
(Male Subjects Only)

1. Yearly Changes in Accident Experience Per 1,000 Driver Years, Trained and Untrained Subjects

	First Year's Rate	Change, Second Over First Year	Change, Third Over Second Year	Change, Fourth Over Third Year	Fourth Year's Rate	Change, Fourth Over First Year
Trained	28	— 5	+2	—10	15	—13
Untrained	35	—15	N.C.	N.C.	20	—15

2. Differences in Yearly Experience, Trained Subjects Compared with Untrained Subjects

First Year	Second Year	Third Year	Fourth Year
—7	+3	+5	—5

3. Differences in Cumulative Experience, Trained Subjects Compared with Untrained Subjects

First Year	First Two Years	First Three Years	All Four Years
—7	—3	+8	—4

. . . Virginia drivers with training have good experience

Table XV

Virginia

The Accident Experience of Trained and Untrained Subjects in Virginia on a Yearly and Cumulative Basis for Four Years
(Male Subjects Only)

Trained

Year of Experience	No. of Subjects	Total Driver Years		No. of Accidents		Accidents Per 1000 Driver Years	
		By Year	Cumulative	By Year	Cumulative	By Year	Cumulative
First	384	384	384	31	31	81	81
Second	384	384	768	29	60	76	78
Third	384	384	1,152	29	89	76	77
Fourth	384	384	1,536	17	106	44	69

Untrained

Year of Experience	No. of Subjects	Total Driver Years		No. of Accidents		Accidents Per 1000 Driver Years	
		By Year	Cumulative	By Year	Cumulative	By Year	Cumulative
First	435	435	435	40	40	92	92
Second	435	435	870	17	57	39	66
Third	435	435	1,305	23	80	53	61
Fourth	435	435	1,740	21	101	48	58

Table XV-a

Virginia

Summary of the Virginia Results on a Yearly and Cumulative Basis
(Male Subjects Only)

1. Yearly Changes in Accident Experience Per 1,000 Driver Years, Trained and Untrained Subjects

	First Year's Rate	Change, Second Over First Year	Change, Third Over Second Year	Change, Fourth Over Third Year	Fourth Year's Rate	Change, Fourth Over First Year
Trained	81	— 5	N.C.	—32	44	—37
Untrained	92	—53	+14	— 5	48	—44

2. Differences in Yearly Experience, Trained Subjects Compared with Untrained Subjects

First Year	Second Year	Third Year	Fourth Year
—11	+37	+23	—4

3. Differences in Cumulative Experience, Trained Subjects Compared with Untrained Subjects

First Year	First Two Years	First Three Years	All Four Years
—11	+12	+16	+11

. . . training pays off for women over period of time

Table XVI

Massachusetts and Virginia

The Accident Experience of Trained and Untrained Subjects in Massachusetts and Virginia (Combined) on a Yearly and Cumulative Basis for Four Years
(Female Subjects Only)

Trained

Year of Experience	No. of Subjects	Total Driver Years		No. of Accidents		Accidents Per 1000 Driver Years	
		By Year	Cumulative	By Year	Cumulative	By Year	Cumulative
First	437	437	437	3	3	7	7
Second	437	437	874	5	8	11	9
Third	437	437	1,311	5	13	11	10
Fourth	437	437	1,748	2	15	5	9

Untrained

Year of Experience	No. of Subjects	Total Driver Years		No. of Accidents		Accidents Per 1000 Driver Years	
		By Year	Cumulative	By Year	Cumulative	By Year	Cumulative
First	330	330	330	2	2	6	6
Second	330	330	660	5	7	15	11
Third	330	330	990	2	9	6	9
Fourth	330	330	1,320	2	11	6	8

Table XVI-a

Massachusetts and Virginia

Summary of the Massachusetts and Virginia Results (Combined) on a Yearly and Cumulative Basis
(Female Subjects Only)

1. Yearly Changes in Accident Experience Per 1,000 Driver Years, Trained and Untrained Subjects

	First Year's Rate	Change, Second Over First Year	Change, Third Over Second Year	Change, Fourth Over Third Year	Fourth Year's Rate	Change, Fourth Over First Year
Trained	7	+4	N.C.	—6	5	—2
Untrained	6	+9	—9	N.C.	6	N.C.

2. Differences in Yearly Experience, Trained Subjects Compared with Untrained Subjects

First Year	Second Year	Third Year	Fourth Year
+1	—4	+5	—1

3. Differences in Cumulative Experience, Trained Subjects Compared with Untrained Subjects

First Year	First Two Years	First Three Years	All Four Years
+1	—2	+1	+1

. . . trained group in Massachusetts has more accidents

Table XVII

Massachusetts

The Accident Experience of Trained and Untrained Subjects in Massachusetts on a Yearly and Cumulative Basis for Four Years (Female Subjects Only)

Trained

Year of Experience	No. of Subjects	Total Driver Years		No. of Accidents		Accidents Per 1000 Driver Years	
		By Year	Cumulative	By Year	Cumulative	By Year	Cumulative
First	100	100	100	0	0	0	0
Second	100	100	200	1	1	10	5
Third	100	100	300	1	2	10	7
Fourth	100	100	400	1	3	10	8

Untrained

Year of Experience	No. of Subjects	Total Driver Years		No. of Accidents		Accidents Per 1000 Driver Years	
		By Year	Cumulative	By Year	Cumulative	By Year	Cumulative
First	100	100	100	1	1	10	10
Second	100	100	200	0	1	0	5
Third	100	100	300	0	1	0	3
Fourth	100	100	400	0	1	0	3

Table XVII-a

Massachusetts

Summary of the Massachusetts Results on a Yearly and Cumulative Basis (Female Subjects Only)

1. Yearly Changes in Accident Experience Per 1,000 Driver Years, Trained and Untrained Subjects

	First Year's Rate	Change, Second Over First Year	Change, Third Over Second Year	Change, Fourth Over Third Year	Fourth Year's Rate	Change, Fourth Over First Year
Trained	0	+10	N.C.	N.C.	10	+10
Untrained	10	—10	N.C.	N.C.	0	—10

2. Differences in Yearly Experience, Trained Subjects Compared with Untrained Subjects

First Year	Second Year	Third Year	Fourth Year
—10	+10	+10	+10

3. Differences in Cumulative Experience, Trained Subjects Compared with Untrained Subjects

First Year	First Two Years	First Three Years	All Four Years
—10	same	+4	+5

trained Virginia women have fewer accidents

Table XVIII

Virginia

The Accident Experience of Trained and Untrained Subjects in Virginia on a Yearly and Cumulative Basis for Four Years (Female Subjects Only)

Trained

Year of Experience	No. of Subjects	Total Driver Years		No. of Accidents		Accidents Per 1000 Driver Years	
		By Year	Cumulative	By Year	Cumulative	By Year	Cumulative
First	337	337	337	3	3	9	9
Second	337	337	674	4	7	12	10
Third	337	337	1,011	4	11	12	11
Fourth	337	337	1,348	1	12	3	9

Untrained

Year of Experience	No. of Subjects	Total Driver Years		No. of Accidents		Accidents Per 1000 Driver Years	
		By Year	Cumulative	By Year	Cumulative	By Year	Cumulative
First	230	230	230	1	1	5	5
Second	230	230	460	5	6	22	13
Third	230	230	690	2	8	9	12
Fourth	230	230	920	2	10	9	11

Table XVIII-a

Virginia

Summary of the Virginia Results on a Yearly and Cumulative Basis (Female Subjects Only)

1. Yearly Changes in Accident Experience Per 1,000 Driver Years, Trained and Untrained Subjects

	First Year's Rate	Change, Second Over First Year	Change, Third Over Second Year	Change, Fourth Over Third Year	Fourth Year's Rate	Change, Fourth Over First Year
Trained	9	+ 3	N.C.	—9	3	—6
Untrained	5	+17	—13	N.C.	9	+4

2. Differences in Yearly Experience, Trained Subjects Compared with Untrained Subjects

First Year	Second Year	Third Year	Fourth Year
+4	—10	+3	—6

3. Differences in Cumulative Experience, Trained Subjects Compared with Untrained Subjects

First Year	First Two Years	First Three Years	All Four Years
+4	—3	—1	—2

. . . four states prove up benefits of training

SUMMING UP THE WOMEN

Observations: Female Subjects

Because of the small number of accidents accumulated by both the trained and untrained female subjects in the Virginia and Massachusetts investigations, little confidence can be placed in the following brief observations about their comparative year-to-year accident experience.

1. No definite or constant margin of difference can be observed between the experience of trained and untrained female drivers either on a yearly or a cumulative basis throughout the four years of the survey period.
2. During the first year, trained females had one more accident per 1,000 driver years than the untrained; during the second year, the trained females had four fewer accidents than the untrained; five more during the third year; and one less during the fourth year (#2, Table XVI-a).
3. On a cumulative basis, the experience of trained and untrained females appears to hold fairly constant—although it may be worth noting that, after their first two years of driving, the experience of the trained is worse, although only slightly worse, than that of the untrained (#3, Table XVI-a).
4. During the course of the entire four-year period, trained females reduced their experience by two accidents per 1,000 driver years, while the untrained showed no change. Trained females reduced their experience by the greatest margin in their fourth year of driving—by 6 accidents per 1,000 driver years (#1, Table XVI-a).

Appendix A

Arizona, Iowa, Maine and North Carolina

In describing the scope of this Report (page 48), it was observed that studies conducted in these four states frequently are quoted as indicative of the beneficial effects of training, but that these studies were being omitted from the Report proper because they were either not of the comparative type or not confined to training received in high school. Brief descriptions of these four studies follow.

Arizona

In lieu of a comparative study of the accident experience of trained and untrained drivers, Arizona conducted a "trend survey" of the number of its high school students annually involved in fatal accidents during the period, 1944 through 1949. During this period, the number of schools in the State offering driver education courses increased steadily, as did also the number of students enrolled in these courses. Arizona offers the decline noted in the fatal accident experience of its high school students during this six-year period as some indication of the beneficial effects of training. This experience is reported as follows:

Year	No. of High School Students Involved in Fatal Accidents
1944	23
1945	11
1946	6
1947	2
1948	3
1949	2

Iowa

The comparative study conducted in Iowa included three different types of driver educated individuals: (1) graduates of high school courses; (2) graduates of professional driving schools; and (3) graduates of the American Automobile Association's driving school. Subjects in the study ranged up to 55 years of age, with the males averaging about 36 and the females about 32 years of age. The average driving experience of males was about 16 years; that of females, about 13 years.

The accident experience survey was conducted sometime in 1952 and apparently covered the past experience of the subjects from that date as far back as possible.

Pertinent data reported from the Iowa study are as follows:

Trained				Untrained			
Males		Females		Males		Females	
No. of Subjects	Accident Involved	No. of Subjects	Accident Involved	No. of Subjects	Accident Involved	No. of Subjects	Accident Involved
227	58	214	8	629	160	245	19

On a percentage basis, the accident-involvement experience of the Iowa trained and untrained subjects was as follows:

Percentage of trained males involved in accidents.....25.6%
Percentage of untrained males involved in accidents....25.5%
Percentage of trained females involved in accidents.... 3.7%
Percentage of untrained females involved in accidents 7.7%

Maine

Since 1950, Maine has kept a record of the number of its driver education graduates becoming involved in traffic accidents of all types. This record has been reported as follows through 1953:

Year	No. of Trained Drivers Involved in Accidents	Age Range
1950	34	?
1951	23	16 — 24
1952	43	15 — 25
1953	45	16 — 22

North Carolina

North Carolina offers the experience of its student school bus drivers as an indication of the beneficial effect of training. It is reported that these student drivers (who make up about 90 per cent of all school bus drivers in the State), have a somewhat better accident record than the adult operators and, further, that North Carolina has a better-than-average safety record in school transportation.[1]

Training received by the student bus operators consists of about five hours of classroom instruction and about two hours of practice driving, both related specifically to the operation of school buses.

Further data are not available.

---

1. Reported in *Driver Education in High Schools*, prepared by Edward Lane-Reticker, asst. director of the Institute of Government at the University of North Carolina.

. . . ex post facto research won't provide answers

Appendix B

Cleveland, Ohio and Detroit, Michigan

Also in connection with defining the scope of this Report (page 48), it was observed that sixteen comparative studies conducted on the city level were being excluded from general treatment, but that pertinent details of two of these—the American Automobile Association's study in Cleveland, Ohio, and a study currently being planned for Detroit, Michigan—would be presented in the Appendix. The Cleveland study, one of the earliest and best known, is quoted probably more than any of the other state or city investigations. The Detroit study, not yet underway, is notworthy for its basic approach to the problem and for the techniques which it proposes employing. Descriptions follow.

Cleveland, Ohio

It is this study, conducted by the American Automobile Association and first published in 1943, which continues to provide a basis for the oft-quoted assertion that "driver training reduces traffic accidents by one-half."

The Cleveland study surveyed the accident records from June, 1939 to November, 1941, of 1,880 subjects who had been trained in the Cleveland High Schools and 1,372 untrained subjects. Subjects were selected from 11 high schools and all were graduated from high schools between June of 1939 (the beginning date of the experience survey) and June of 1941.

Pertinent data for male subjects only in the Cleveland sutdy are as follows:

	No. of Subjects	Total Man-Months of Licensed Driving	No. of Accidents	Accidents Per 1,000 Man-Months
Trained				
Males	1,273	17,166	48	2.8
Untrained				
Males	1,151	14,164	76	5.4

Observation:

The trained males had 2.6 or 48 per cent fewer accidents per 1,000 man-months than the untrained.

Detroit, Michigan

Significant features of the comparative study currently being planned in Detroit can best be explained by quoting from a report, "Résumé of Proposal for Driver Education Research," presented on November 3, 1954 at a Director's Meeting of the Michigan Inter-Industry Highway Safety Committee by Fred N. Kreslinger, asst. professor of Educational Sociology and Psychology of Wayne University:

> "The supposed effectiveness of driver education in public high schools has been investigated in many parts of the United States, and the general conclusion that emerges from these investigations is that driver education substantially cuts down violations, convictions, arrests, and accidents. However, this conclusion has been seriously questioned because almost all the research has been of the *ex post facto* kind (research done after the fact, i.e., by studying the situation *after* the presumed causative factors have operated—and thus control and manipulation by the researcher were not possible). In brief, the conclusions as stated cannot be accepted since what may have been the main causative factors were not controlled. Particularly significant among these uncontrolled factors are attitudes. It is highly probable that the main factor in determining a "safe" or an "unsafe" driver is the driver's attitude toward safety in general. To the writer's knowledge, no research has attempted systematically to investigate and control predilection toward safety. None of the research has tried to determine the relationship between attitudes and the criteria of arrests, convictions, violations, and accidents, nor has it attempted to control the attitude factor by determining subjects' attitudes *before and after* driver training. Accordingly, there would seem to be a great need for studies which try to control the attitude dimension difficult as such studies may be.
>
> "The research design here proposed has two main points: (1) the measurement and control of attitudes toward safety, and (2) lengthening of the time dimension so that subjects' attitudes and attitude change can be determined over time, so that the criteria of arrests, convictions, violations, and accidents will be of sufficient quantity to make reliable study possible. Two (or three) matched groups (matched mainly on sex and socio-economic status) will be selected in each of the eight schools that offer driver education in Detroit. Students will have no choice as to whether they will or will not take driver education courses (to prevent the above-mentioned "self-selective" factors, i.e., "safe" students tend to elect driver education courses, and "unsafe" students tend not to elect the courses); selection will be entirely in the hands of the researchers. One group, the experimental group, will be assigned to driver education; the other group, the control group, will not be permitted to take driver education during the research—or ever. All subjects' attitudes will be measured by specially constructed instruments before and after driver training. In addition, a sample of the students of both groups will be interviewed principally as a validation procedure. Then, all subjects' driving records will be followed for five years, probably at yearly intervals, attitudes will be measured at intervals, and subjects will be interviewed periodically. (Of course, other measuring devices will also be used.) Other factors to be investigated are: the efficacy of class instruction alone compared to behind-the-wheel instruction plus class instruction; the relative merits of on-street and off-street instruction; the relationship between parent and student attitudes toward safety. With such a design, it is expected that much more dependable answers to the questions which have been plaguing safety people will be answered—at least in part.
>
> "The cost of the whole project will be about $16,000 (about $8,000 the first year). And, as outlined above, it will take five years (less time may give the answers, but it is somewhat doubtful because of the need for sufficient numbers of criteria cases). The staff involved will be a research director, an assistant research director, and varying numbers of assistants (for interviewing, typing, etc.). It should be noted that there will be important by-products and implications of the proposed study. The most important of these will be clues as to *how* driver education should be taught (but actually more research will be needed on this point). Another by-product will be the hypotheses and ideas for future research and action in driver education that should emerge from the work. It should also be noted that the time and place for this research seem to be just right. Detroit is uniquely suited to the work since, among other things, it has eight high schools with driver education, four with on-street and four with off-street training. At this time, too, excellent cooperation can probably be gotten from school authorities. Also, a new state system of record-keeping is being instituted this year.
>
> "In conclusion, experts in the field of driver education seem to agree that research of the kind outlined above is the only kind that can possibly supply answers to the questions that traffic and education people are asking. Large sums are being spent in driver education, and these expenditures are being questioned. This is not to mention the lives being lost on the highways. It is conceivable that this research will help to clarify the problem. At the very least, it is quite sure that *ex post facto* studies and other short-range controlled schemes will never give adequate answers to the questions being asked. END

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Be prepared before unexpected storms ice your streets and highways. Eliminate confusion, extra work and accidents by stockpiling Morton Rock Salt now for winter ice and snow removal. Store it in unused buildings, garages, loading platforms or outdoors near key traffic points. You can do this without loss or inconvenience—and, if you wish, a Morton Consulting Engineer will be happy to advise you.

Morton Rock Salt is 8 times better than abrasives. One man and one truckload of Morton Rock Salt does a better job of ice and snow removal than 8 men and 8 loads of abrasives. Morton Rock Salt leaves no messy residue on streets, in gutters and sewers . . . needs no flushing after a thaw . . . won't blow away or leave a rutted, dirty pavement. Non-toxic, Morton Rock Salt also is inexpensive. (It generally costs far less than calcium chloride.)

Send for more information today! Fill in and mail coupon below for valuable help with ice and snow removal.

☐ *Please send me your free book on ice and snow removal.*

☐ *I would like a Morton representative to advise me on how best to stockpile Morton Rock Salt for my town.*

Name_____

Title_____

Address_____

City_____ County_____ State_____

MORTON SALT COMPANY

INDUSTRIAL DIVISION

Dept. T-9, 120 So. La Salle Street

Chicago 3, Illinois

Circle Item No. 11—Reader Service Card